

Taís de Souza Barbosa

Cirurgiã Dentista

**Avaliação da qualidade de vida relacionada à
saúde bucal e fatores associados em crianças e
pré-adolescentes**

Tese apresentada à Faculdade de Odontologia de Piracicaba,
Universidade Estadual de Campinas, como requisito para a
obtenção do Título de Doutor em Odontologia, Área de
Concentração: Odontopediatria.

Orientadora: Profa. Dra. Maria Beatriz Duarte Gavião

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Raphael Freitas de Souza

Ana Lidia Ciamponi

Fernando Neves Hugo

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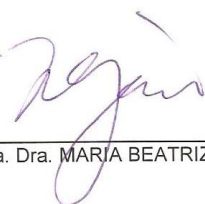
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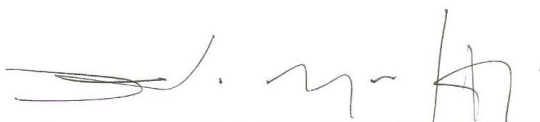
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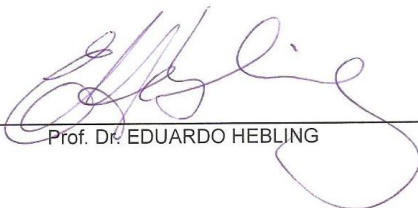
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Prof. Dr. FERNANDO NEVES HUGO

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Prof. Dr. EDUARDO HEBLING

DEDICATÓRIA

Dedico este trabalho aos meus pais...

José Luiz e Gracinda

... meu porto seguro!

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*“Feliz aquele que transfere o que sabe
e aprende o que ensina”*

Cora Coralina

PALCO DA VIDA

“Você pode ter defeitos, viver ansioso e ficar irritado algumas vezes, mas não se esqueça de que sua vida é a maior empresa do mundo. E você pode evitar que ela vá à falência. Há muitas pessoas que precisam, admiram e torcem por você. Gostaria que você sempre se lembrasse de que ser feliz não é ter um céu sem tempestade, caminhos sem acidentes, trabalhos sem fadigas, relacionamentos sem decepções. Ser feliz é encontrar força no perdão, esperança nas batalhas, segurança no palco do medo, amor nos desencontros. Ser feliz não é apenas valorizar o sorriso, mas refletir sobre a tristeza. Não é apenas comemorar o sucesso, mas aprender lições nos fracassos. Não é apenas ter júbilo nos aplausos, mas encontrar alegria no anonimato. Ser feliz é reconhecer que vale a pena viver, apesar de todos os desafios, incompreensões e períodos de crise. Ser feliz é deixar de ser vítima dos problemas e se tornar um autor da própria história. É atravessar desertos fora de si, mas ser capaz de encontrar um oásis no recôndito da sua alma. Ser feliz é não ter medo dos próprios sentimentos. É saber falar de si mesmo. É ter coragem para ouvir um "não". É ter segurança para receber uma crítica, mesmo que injusta. Ser feliz é deixar viver a criança livre, alegre e simples, que mora dentro de cada um de nós. É ter maturidade para falar "eu errei". É ter ousadia para dizer "me perdoe". É ter sensibilidade para expressar "eu preciso de você". É ter capacidade de dizer "eu te amo". É ter humildade e receptividade. Desejo que a vida se torne um canteiro de oportunidades para você ser feliz... E, quando você errar o caminho, recomece, pois assim você descobrirá que ser feliz não é ter uma vida perfeita, mas usar as lágrimas para irrigar a tolerância. Usar as perdas para refinar a paciência. Usar as falhas para lapidar o prazer. Usar os obstáculos para abrir as janelas da inteligência. Jamais desista de si mesmo. Jamais desista das pessoas que você ama. Jamais desista de ser feliz, pois a vida é um espetáculo imperdível, ainda que se apresentem dezenas de fatores a demonstrarem o contrário.

Pedras no caminho? Guardo todas... Um dia vou construir um castelo!”

Fernando Pessoa

RESUMO

Nas últimas duas décadas, houve aumento substancial do interesse sobre a qualidade de vida relacionada à saúde bucal (QVRSB) de crianças e adolescentes, o que se deve ao fato das doenças bucais comprometerem significativamente os aspectos físicos, emocionais e sociais destes indivíduos. Assim, o objetivo geral desta pesquisa foi avaliar a QVRSB e fatores associados em crianças e pré-adolescentes, de oito a catorze anos, de ambos os gêneros, escolares da rede pública do município de Piracicaba, SP. Na avaliação de saúde bucal as seguintes variáveis foram consideradas: presença e severidade de cárie, maloclusão, fluorose, gengivite, de acordo com os critérios da Organização Mundial da Saúde, e sinais e sintomas de disfunção temporomandibular (DTM), por meio do *Research Diagnostic Criteria/Temporomandibular Disorders* - eixo I. A auto-percepção da QVRSB foi avaliada por meio de questionários específicos para os grupos etários, as versões brasileiras do *Child Perceptions Questionnaire* (CPQ), para crianças de oito a dez e onze anos (CPQ₈₋₁₀) e pré-adolescentes de onze a catorze anos (CPQ₁₁₋₁₄). Duas questões destes questionários também foram utilizadas para avaliar as percepções globais de saúde bucal (SB) e bem-estar (BE). Na avaliação dos fatores associados à QVRSB, as variáveis consideradas foram: características sociodemográficas (idade e gênero da criança, número de adultos em casa e nível educacional da mãe), utilização de serviços odontológicos (experiência passada e atual) e hábitos de higiene bucal (frequência de escovação). Os sintomas de ansiedade e depressão foram avaliados por meio das versões brasileiras do *Revised Children's Manifest Anxiety Scale* (RCMAS) e do *Children's Depression Inventory* (CDI), respectivamente. Para avaliar as concentrações de cortisol salivar foram coletadas amostras de saliva 30 minutos após acordar (jejum) e à noite (antes de dormir) para determinar o declínio diurno de cortisol salivar ($\mu\text{g/dl}$), calculado pela diferença entre os valores da primeira e segunda coletas. As concentrações de cortisol salivar foram determinadas por meio de análise imunoenzimática. Os dados obtidos foram discutidos em quatro estudos, denominados capítulos no presente trabalho. Os objetivos específicos do primeiro (*Evaluating oral health-related quality of life measure for children and preadolescents with temporomandibular disorder*) e segundo (*Oral health-related quality*

of life in children and preadolescents with dental caries, malocclusions or temporomandibular disorders) capítulos foram, respectivamente, avaliar as propriedades psicométricas dos questionários para uso em crianças e pré-adolescentes com sinais e sintomas de DTM e comparar a percepção de QVRSB entre grupos com diferentes condições bucais (cárie, maloclusão e DTM) e grupo controle. O segundo estudo também objetivou identificar os conceitos associados às respostas sobre SB e BE em cada grupo clínico. Os questionários mostraram-se válidos e confiáveis para uso em crianças e pré-adolescentes com sinais e sintomas de DTM. Além disso, os instrumentos apresentaram propriedade discriminativa entre indivíduos com diferentes condições clínicas e o grupo controle, mas não entre os grupos clínicos. Por fim, os resultados sugeriram que as crianças e pré-adolescentes apresentam visão multidimensional sobre os conceitos de SB e BE. Estes resultados possibilitaram testar as propriedades psicométricas dos questionários em indivíduos com diferentes condições clínicas e iniciar uma série de estudos sobre os fatores associados à auto-percepção da QVRSB. Sendo assim, o terceiro estudo (*Factors associated with oral health-related quality of life in children and preadolescents*) objetivou avaliar os fatores associados à auto-percepção de QVRSB. Sinais e sintomas de DTM e sintomas de ansiedade em crianças e depressão em pré-adolescentes estiveram associadas com maior impacto na QVRSB destes indivíduos. Para melhorar o entendimento sobre a relação entre os fatores psicológicos e as percepções de SB e BE destes indivíduos, o quarto estudo (*Relationships among oral conditions, global ratings of oral health, overall well-being and emotional statuses of children and preadolescents*) objetivou avaliar a associação entre as condições bucais, percepções globais de SB e BE e variáveis psicológicas (sintomas de ansiedade e depressão) e fisiológicas (declínio diurno de cortisol salivar) desta população. O aumento na idade e maiores concentrações de cortisol salivar estiveram associados com maiores impactos na percepção global de saúde bucal, enquanto que sinais e sintomas de disfunção temporomandibular e sintomas de depressão estiveram associados ao maior comprometimento do bem-estar geral.

Palavras-chaves: adolescente, ansiedade, cortisol salivar, criança, depressão, qualidade de vida relacionada à saúde bucal

ABSTRACT

Over the past two decades, there has been substantial increase in concern about the impact of oral health-related quality of life (OHRQoL) of children and adolescents, which has been due to the fact that oral diseases significantly compromise the physical, emotional and social needs of these individuals. Thus, this research aimed to evaluate the OHRQoL and associated factors in 8- to 14-yr-old children and preadolescents, of both genders, students of public schools of Piracicaba, SP. To evaluate the oral health, the following variables were considered: presence and severity of dental caries, malocclusion, fluorosis, gingivitis according to World Health Organization, and signs and symptoms of temporomandibular disorder (TMD), using the Research Diagnostic Criteria/Temporomandibular Disorders - axis I. Self-perceived of OHRQoL was assessed using age-specific questionnaires, the Brazilian versions of the Child Perceptions Questionnaire (CPQ) for 8- to 10 yr-old children (CPQ₈₋₁₀) and 11- to 14-yr-old preadolescents (CPQ₁₁₋₁₄). Two questions of these questionnaires were also used to assess the global ratings of oral health (OH) and overall well-being (OWB). Sociodemographic characteristics (the child's age and gender, the number of adults in the household and the mother's educational level), dental service utilization (past and current actual experience) and the child's oral hygiene habits (tooth brushing frequency) were evaluated as part of the factors associated with OHRQoL. Symptoms of anxiety and depression were assessed using the Portuguese versions of the Revised Children's Manifest Anxiety Scale (RCMAS) and the Children's Depression Inventory (CDI), respectively. To evaluate the salivary cortisol concentrations, saliva sampling was collected 30 minutes after awakening (fasting) and at night (bedtime) to determine the diurnal decline of salivary cortisol (in µg/dl), then, the difference between the values of the first and second samples were obtained. Salivary cortisol concentrations were determined by enzyme immunoassay analysis. The data were discussed in four studies, denominated as chapters in this work. The specific objectives of the first (*Evaluating oral health-related quality of life measure for children and preadolescents with temporomandibular disorder*) and second (*Oral health-related quality of life in children and preadolescents with dental caries, malocclusions or*

temporomandibular disorders) chapters were to evaluate the psychometric properties of the questionnaires for using in children and preadolescents with signs and symptoms of TMD, to compare the OHRQoL of groups with different oral conditions (caries, malocclusion and TMD) and controls, respectively. The second study also aimed to identify the concepts associated with the responses of each clinical group to OH and OWB. The questionnaires showed to be valid and reliable for use in children and preadolescents with signs and symptoms of TMD. In addition, the questionnaires discriminated between individuals with different clinical conditions and controls, but not within clinical groups. Finally, the results suggested that children and preadolescents view their OH and OWB as multidimensional concepts. These results provide the opportunity to test the psychometric properties of the questionnaires among individuals presenting a variety of clinical conditions and to start a series of studies about the factors associated with the self-perception of OHRQoL. In this way, the third study (*Factors associated with oral health-related quality of life in children and preadolescents*) aimed to evaluate the factors associated with self-perception of OHRQoL. Signs and symptoms of TMD and symptoms of anxiety in children and depression in preadolescents were associated with higher impact on their OHRQoL. To improve the understanding about the relation between psychological factors and the perception of OH and OWB of these individuals, the fourth study (*“Relationships among oral conditions, global ratings of oral health, overall well-being and emotional statuses of children and preadolescents”*) aimed to evaluate the associations between oral conditions, global ratings of OH and OWB and psychological (symptoms of anxiety and depression) and physiological (diurnal decline of salivary cortisol) variables. Older children and higher levels of salivary cortisol were associated with negative impacts on global ratings of OH, while signs and symptoms of TMD and symptoms of depression were associated with negative impacts on global ratings of OWB.

Key words: adolescent, anxiety, salivary cortisol, child, depression, oral health-related quality of life

SUMÁRIO

INTRODUÇÃO	1
CAPÍTULOS	5
Capítulo 1	7
Evaluating oral health-related quality of life measure for children and preadolescents with temporomandibular disorder	
Capítulo 2	39
Oral health-related quality of life in children and preadolescents with dental caries, malocclusions or temporomandibular disorders	
Capítulo 3	67
Factors associated with oral health-related quality of life in children and preadolescents	
Capítulo 4	93
Relationships among oral conditions, global ratings of oral health, overall well-being and emotional statuses of children and preadolescents	
CONCLUSÕES	115
REFERÊNCIAS	117
APÊNDICE 1	119
Termo de Consentimento Livre e Esclarecido	
APÊNDICE 2	124
Ficha de Anamnese	
APÊNDICE 3	127
Ficha Clínica	
APÊNDICE 4	128
Questionário de Saúde Bucal Infantil – 8 a 10 anos	
APÊNDICE 5	137
Questionário de Saúde Bucal Infantil – 11 a 14 anos	
ANEXO 1	150
Research Diagnostic Criteria – Eixo I	
ANEXO 2	155

Research Diagnostic Criteria – Eixo II

ANEXO 3	156
Sintomas de Disfunção Temporomandibular	
ANEXO 4	157
Escala de Ansiedade ““O que Penso e Sinto”	
ANEXO 5	159
Questionário de Depressão da Criança	
ANEXO 6	163
Certificado do Comitê de Ética em Pesquisa	
ANEXO 7	164
Certificado de revisão do idioma – American Journal of Experts	
ANEXO 8	165
Certificado de revisão do idioma – American Journal of Experts	
ANEXO 9	166
Certificado de revisão do idioma – American Journal of Experts	
ANEXO 10	167
Certificado de revisão do idioma – American Journal of Experts	
ANEXO 11	168
Comprovante – publicação de artigo no periódico <i>Health and Quality of Life Outcomes</i>	
ANEXO 12	169
Comprovante – submissão de artigo no periódico <i>Clinical Oral Investigations</i>	
ANEXO 13	170
Comprovante – submissão de artigo no periódico <i>Quality of Life Research</i>	

INTRODUÇÃO

Nas últimas duas décadas, observou-se aumento na frequência das avaliações de qualidade de vida relacionada à saúde bucal (QVRSB) em crianças e adolescentes acometidos por uma variedade de condições bucais, as quais podem comprometer os aspectos funcionais, psicológicos e sociais destes indivíduos (Barbosa & Gavião, 2008). Estas condições variam desde doenças/alterações mais prevalentes, como cárie dentária e maloclusão, até alterações relativamente prevalentes, como disfunções temporomandibulares. No Brasil, tem sido observada a média de CPOD de 1,2 aos 12 anos de idade, segundo levantamento epidemiológico do SB Brasil 2010 (www.saude.gov.br). Considerando a região sudeste do Brasil, estudos recentes detectaram presença de cárie em 48% da população de 12 anos (Pereira *et al.*, 2007), necessidade de tratamento ortodôntico em 33,3% dos sujeitos de 9 a 12 anos (Pereira *et al.*, 2007) e sinais e sintomas de disfunção temporomandibular (DTM) em 5% da população de 12 anos (Dias & Gleiser, 2009), examinada por meio do *Research Diagnostic Criteria* – eixo I (Dworkin & LeResche, 1992). A diferença na prevalência destas condições bucais resulta no maior número de estudos sobre QVRSB envolvendo indivíduos com cárie e maloclusão (Barbosa & Gavião, 2008) quando comparadas àquelas que apresentam sinais e sintomas de DTM (Jedel *et al.*, 2007). Considerando que crianças e adolescentes com sinais e sintomas de DTM associados à dor por mais de uma semana tenham relatado comprometimento das atividades físicas diárias, tarefas escolares e relacionamento com amigos (Jedel *et al.*, 2007) e que não há instrumentos específicos para avaliação da QVRSB validados para esta condição clínica, a mensuração das propriedades psicométricas destes instrumentos mostra-se necessária.

Os instrumentos *Child Perceptions Questionnaires* (CPQ) fornecem medidas específicas para grupos etários entre 8 e 10 anos (Child Perceptions Questionnaire - CPQ₈₋₁₀) (Jokovic *et al.*, 2004) e entre 11-14 anos (CPQ₁₁₋₁₄) (Jokovic *et al.*, 2002) e vem sendo amplamente utilizados para avaliar a auto-percepção de QVRSB destes indivíduos. No Brasil, um estudo preliminar confirmou a validade e confiabilidade destes instrumentos para uso em crianças e pré-adolescentes com diferentes doenças bucais, como cárie, maloclusão, gengivite e fluorose (Barbosa *et al.*, 2009). Entretanto, as respectivas

propriedades psicométricas ainda não foram testadas em indivíduos com sinais e sintomas de DTM. Além disso, a validade discriminativa destes instrumentos em comparar as percepções de QVRSB em grupos com diferentes doenças foi avaliada apenas em função da severidade destas condições, sendo necessários novos estudos para confirmar tal propriedade entre grupos clínicos e grupo controle.

Para Wilson e Cleary (1995), as percepções de saúde e qualidade de vida são determinadas não somente pela natureza e severidade da doença, mas também por características individuais e ambientais. Locker (2007) avaliou as diferenças na percepção de QVRSB em função do nível socioeconômico, sendo encontrado maior comprometimento deste construto em pré-adolescentes de baixo nível socioeconômico. Outros estudos têm sugerido a influência de fatores psicológicos, como a auto-estima e bem-estar psicológico (sintomas de ansiedade, depressão e infelicidade), na percepção da QVRSB de pré-adolescentes (Agou *et al.*, 2008; 2011). Neste contexto, foi observado que pré-adolescentes com baixa auto-estima (Agou *et al.* (2008) e maior comprometimento do bem-estar psicológico, caracterizado pelo relato de sintomas de ansiedade, depressão e infelicidade (Agou *et al.* (2011) apresentaram maior comprometimento da QVRSB. Hirsch e Türp (2010) observaram aumento nos sintomas depressivos e impacto na qualidade de vida relacionada à saúde de adolescentes em função da sintomatologia dolorosa associada à DTM. Há ainda estudos que sugerem a influência do estresse psicológico no desenvolvimento de doenças bucais em crianças. Foram observadas correlações positivas entre cárie dentária e níveis basais de cortisol salivar, como resposta a um evento estressor (Boyce *et al.*, 2010). Rai *et al.* (2010) encontraram aumento nos níveis de cortisol salivar em crianças com cárie precoce da infância e diminuição destes após o período de três meses, quando finalizado o tratamento odontológico. Estes resultados sugeriram que as crianças com maior experiência de cárie dentária apresentam capacidade reduzida de enfrentamento a situações estressantes. Por outro lado, no estudo de Kambalimath *et al.* (2010), o estresse produzido por diferentes procedimentos odontológicos, bem como, a capacidade de enfrentamento a situações estressantes foram semelhantes em crianças com e sem cárie. Sendo assim, a relação entre fatores psicológicos e auto-percepção da saúde e bem-estar ainda é controversa na literatura, sendo necessários novos estudos para confirmar

estes resultados e aprimorar o entendimento sobre a relação entre os fatores associados à percepção de QVRSB desta população.

Sendo assim, o objetivo geral desta pesquisa foi avaliar a QVRSB e fatores associados em crianças e pré-adolescentes, de oito a catorze anos, de ambos os gêneros, escolares da rede pública do município de Piracicaba, SP. Os objetivos específicos deste trabalho foram avaliar as propriedades psicométricas dos questionários CPQ₈₋₁₀ e CPQ₁₁₋₁₄ para uso em crianças e pré-adolescentes com sinais e sintomas de DTM, comparar as percepções de QVRSB entre grupos com diferentes condições bucais (cárie, maloclusão e DTM) e grupo controle, identificar os conceitos associados às respostas de cada grupo clínico, avaliar a influência de variáveis sociodemográficas (idade e gênero da criança, número de adultos em casa e nível educacional da mãe), clínicas (cárie, maloclusão, gengivite, fluorose, sinais e sintomas de DTM), psicológicas (sintomas de ansiedade e depressão) utilização de serviços odontológicos (experiência passada e atual) e hábitos de higiene bucal (frequência de escovação) nas percepções de QVRSB e avaliar a associação entre as condições bucais, percepções globais de saúde bucal e bem-estar geral e variáveis psicológicas e fisiológicas (declínio diurno de cortisol salivar) desta população.

CAPÍTULOS

Esta tese está baseada na Resolução CCPG UNICAMP/002/06 que regulamenta o formato alternativo para teses de Mestrado e Doutorado e permite a inserção de artigos científicos de autoria ou co-autoria do candidato. Por se tratar de pesquisa envolvendo seres humanos, o projeto de pesquisa deste trabalho foi submetido à apreciação do Comitê de Ética em Pesquisa da Faculdade de Odontologia de Piracicaba, tendo sido aprovado (Anexo 6). Sendo assim, esta tese é composta de quatro capítulos, conforme descrito abaixo:

CAPÍTULO 1

“Evaluating oral health-related quality of life measure for children and preadolescents with temporomandibular disorder”; Barbosa TS, Leme MS, Castelo PM, Gavião MBD. Artigo publicado no periódico *Health and Quality of Life Outcomes*.

CAPÍTULO 2

“Oral health-related quality of life in children and preadolescents with dental caries, malocclusions or temporomandibular disorders”; Barbosa TS, Castelo PM, Leme MS, Gavião MBD. Submetido ao periódico *Clinical Oral Investigations*.

CAPÍTULO 3

“Factors associated with oral health-related quality of life in children and preadolescents”; Barbosa TS, Leme MS, Castelo PM, Gavião MBD. Submetido ao periódico *Quality of Life Research*.

CAPÍTULO 4

“Relationships among oral conditions, global ratings of oral health, overall well-being and emotional statuses of children and preadolescents”; Barbosa TS, Castelo PM, Leme MS, Gavião MBD.

CAPÍTULO 1

Evaluating oral health-related quality of life measure for children and preadolescents with temporomandibular disorder

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TAÍS S BARBOSA¹, MARINA S LEME¹, PAULA M CASTELO², MARIA BEATRIZ D GAVIÃO¹

¹ Department of Pediatric Dentistry, Piracicaba Dental School, University of Campinas, Piracicaba/SP, Brazil

² Department of Biological Sciences, Federal University of São Paulo, Diadema/SP, Brazil

E-mails:

tais_sb@yahoo.com

ma_leme@terra.com.br

pcasteloferreira@hotmail.com

mbgaviao@fop.unicamp.br

Correspond with:

Prof. Maria Beatriz Duarte Gavião

Faculdade de Odontologia de Piracicaba/UNICAMP – Departamento de Odontologia Infantil – Área de Odontopediatria

Adress: Av. Limeira 901, Piracicaba/SP, Brasil / Zip code: 13414-903

Phone: 55 19 2106 5368/5287 – Fax: #55-19-21065218

E-mail: mbgaviao@fop.unicamp.br

ABSTRACT

Background: Oral health-related quality of life (OHRQoL) in children and adolescents with signs and symptoms of temporomandibular disorder (TMD) has not yet been measured. This study aimed to evaluate the validity and reliability of OHRQoL measure for use in children and preadolescents with signs and symptoms of TMD. **Methods:** Five hundred and forty-seven students aged 8-14 years were recruited from public schools in Piracicaba, Brazil. Self-perceptions of QoL were measured using the Brazilian Portuguese versions of Child Perceptions Questionnaires (CPQ)₈₋₁₀ (n=247) and CPQ₁₁₋₁₄ (n=300). A single examiner, trained and calibrated for diagnosis according to the Axis I of the Research Diagnostic Criteria for TMD (RDC/TMD), examined the participants. A self-report questionnaire assessed subjective symptoms of TMD. Intraexaminer reliability was assessed for the RDC/TMD clinical examinations using Cohen's Kappa (κ) and intraclass correlation coefficient (ICC). Criterion validity was calculated using the Spearman's correlation, construct validity using the Spearman's correlation and the Mann-Whitney test, and the magnitude of the difference between groups using effect size (ES). Reliability was determined using Cronbach's alpha, alpha if the item was deleted and corrected item-total correlation. **Results:** Intraexaminer reliability values ranged from regular (κ =0.30) to excellent (κ =0.96) for the categorical variables and from moderate (ICC=0.49) to substantial (ICC=0.74) for the continuous variables. Criterion validity was supported by significant associations between both CPQ scores and pain-related questions for the TMD groups. Mean CPQ₈₋₁₀ scores were slightly higher for TMD children than control children (ES=0.43). Preadolescents with TMD had moderately higher scores than the control ones (ES=0.62; $p<0.0001$). Significant correlation between the CPQ scores and global oral health, as well as overall well-being ratings ($p<0.001$) occurred, supporting the construct validity. The Cronbach's alphas were 0.93 for CPQ₈₋₁₀ and 0.94 for CPQ₁₁₋₁₄. For the overall CPQ₈₋₁₀ and CPQ₁₁₋₁₄ scales, the corrected item-total correlation coefficients ranged from 0.39-0.76 and from 0.28-0.73, respectively. The alpha coefficients did not increase when any of the items were deleted in either CPQ samples. **Conclusions:** The questionnaires are valid and reliable for use in children and preadolescents with signs and symptoms of temporomandibular disorder.

INTRODUCTION

Over the years, different theories of etiology and different emphases on the causative factors for the various signs and symptoms of temporomandibular disorder (TMD) have been proposed in the literature [1]. The current perspective regarding TMD is now multidimensional, with an appreciation that a combination of physical, psychological and social factors may contribute to the overall presentation of this disorder. Hence, today there is a preference for a biopsychosocial integrated approach [2]. Accordingly, TMD patients are a target population for quality of life (QoL) assessments because of the considerable psychosocial impact of orofacial pain [3]. TMD have generally been presumed to be conditions affecting only adults; however, epidemiological studies have reported signs and symptoms in children and adolescents to be as frequent as in adults [4] and the prevalence varies widely in the literature from 16% to 90%, due to the methodologies focusing largely on samples of patients seeking treatment or because they were conducted on convenience non-representative samples of the population. Brazilian studies have shown that in primary dentition 34% of the 99 children presented at least one sign and/or one symptom of TMD [5]. In the age of 12 years, 2.19% of the boys and 8.18% of the girls met the Research Diagnostic Criteria for TMD (RDC/TMD) when examined [6]. From 15 to 20 years-old 35.4% presented at least one symptom of TMD [7]. Signs and symptoms in childhood and adolescence have been indicating mild disorders, but these findings do not detract from the importance of early diagnosis to provide proper growth and development of the stomatognathic system [8]. Additionally the known fluctuation in signs and symptoms of musculoskeletal disorders in a time-dependent context might have been better addressed by carrying out repeated clinical recordings [4]. In addition, Dahlström and Carlsson [9], in a recent systematic review, observed a substantial negative impact on oral health-related quality of life (OHRQoL) in patients diagnosed with TMDs, being greater than other orofacial diseases/illnesses or conditions.

In this way, measuring health-related quality of life (HRQoL) in TMD patients with generic or condition-specific HRQoL instruments can complement efficacy measures, offering a complete picture of the impact of disease and treatment on overall well-being, as observed in adolescents with type 1 diabetes [10]. Jedel *et al.* [11] compared the HRQoL

between children with TMD pain and a control group, using the Child health questionnaire-child form 87 (CHQ-CF87), a generic multidimensional instrument designed to assess physical and psychosocial impacts on children and adolescents aged 10-18 years. Although the results supported the use of generic instrument to measure health and to evaluate the efficacy of treatment in pediatric patients with TMD pain [11], other authors recommend the use of condition-specific instruments, which are more sensitive for detecting slight changes in specific conditions [12] and might allow a more detailed evaluation of the disability caused by TMD [13]. Accordingly, studies were conducted to evaluate the impact of TMD and associated pain on QoL in adult [3, 12, 14, 15] and elderly [16] populations, using a condition-specific instruments, i.e., an OHRQoL measure (e.g., Oral Health Impact Profile and Geriatric Oral Health Assessment Index). The concepts in OHRQoL provide an opportunity to summarize a variety of possible psychosocial impacts in relation to specific oral diseases [14].

Measures have been developed specifically for assessing OHRQoL of children and adolescents [17-21]. The Child Perceptions Questionnaire (CPQ) is a measure applicable to children with a wide variety of oral and orofacial conditions, based on contemporary concepts of pediatric health and which can accommodate developmental differences among children across age ranges [17, 18]. It consists of two age specific instruments for children aged 8-10 years (CPQ₈₋₁₀) [18] and 11-14 years (CPQ₁₁₋₁₄) [17]. A preliminary study has confirmed the validity and reliability of these measures for use in Brazilian children and adolescents [22]. Although these questionnaires are standardized and widely used for other oral conditions, they have not yet been tested in TMD samples.

Assessing the impact of TMD on children's QoL is important in many fronts. It provides an insight into the potential consequences of TMD to the day-to-day lives of children and thereby facilitates understanding of its importance in the provision of oral health care [23]. Moreover, identifying factors associated with the impact of TMD on children's QoL can influence management of such cases and inform best practice guidelines [24]. In this way, the present study aimed to test the validity and reliability of CPQ used in a population of Brazilian public school students aged 8-14 years to determine whether these measures are sensitive to clinical signs and subjective symptoms of TMD.

An additional aim was to verify whether the presence and severity of signs and symptoms of TMD are sufficient to influence OHRQoL of this age-specific population.

MATERIAL AND METHODS

This study was approved by the Research Ethics Committee of the Dental School of Piracicaba, State University of Campinas (protocol n° 021/2006).

A cross-sectional study with students of public schools of Piracicaba, Brazil, was developed. Piracicaba city has 368.843 scholars, with 50.187 enrolled in the elementary school system (www.ibge.gov.br). The sample size was calculated by Epi info version 6.0.1 software. A standard error of 2%, a 95% confidence interval level and a 5.73% prevalence of TMD [25] were used for the calculation. The minimum sample size to satisfy the requirements was estimated at 513 subjects. A total of 547 students (235 boys and 312 girls), with no systemic diseases or communication and/or neuromuscular problems, participated in the study. The subjects ranged from 8 to 14 years of age, and were from nine public schools, which were randomly selected. All students obtained parental consent.

The exclusion criteria were conditions/children with facial traumatism, neurological or psychiatric disorders, use of dental prostheses, current use of medications (e.g., antidepressive, muscle relaxant, narcotic or non-steroidal anti-inflammatory), previous or present orthodontic treatment and other orofacial pain conditions, which could interfere with TMD diagnoses.

Data collection

Oral health-related quality of life evaluation

Data were collected using the Portuguese versions of the CPQ for individuals aged 8-10 years (CPQ₈₋₁₀) and 11-14 years (CPQ₁₁₋₁₄) [22]. These formed the components of the Child Oral Health Quality of Life Questionnaire that had been designed to assess the impact of oral conditions on the QoL of children and adolescents [17, 18]. They were both self-completed. Items of the CPQ used Likert-type scales with response options of “Never” = 0; “Once or twice” = 1; “Sometimes” = 2; “Often” = 3; and “Very often” = 4. For the CPQ₁₁₋

¹⁴, the recall period was three months, while for that of the CPQ₈₋₁₀, it was four weeks. Items were grouped into four domains: oral symptoms, functional limitations, emotional well-being and social well-being.

Children and adolescents were also asked to give overall or global assessments of their oral health and the extent to which the oral or oro-facial condition affected their overall well-being. These questions preceded the multi-item scales in the questionnaires. A four-point response format, ranging from “Very good” = 0 to “Poor” and from “Not at all” = 0 to “A lot” = 3, was offered for these ratings in CPQ₈₋₁₀. In CPQ₁₁₋₁₄, these global ratings had a five-point response format ranging from “Excellent” = 0 to “Poor” = 5 for oral health and from “Not at all” = 0 to “Very much” = 5 for well-being.

Evaluation of signs and symptoms of TMD

Intraexaminer reliability

Prior to the clinical examinations, the dental examiner (TSB) participated in the calibration process, which was divided into theoretical discussions on codes and criteria for the study, as well as practical activities. Intra-examiner reliability was investigated by conducting replicated examinations on 20 individuals one week later to minimize recall bias as a result of the first test.

RDC/TMD

The RDC/TMD is a classification system composed by a dual-axis approach: Axis I (physical findings) and Axis II (pain-related disability and psychosocial status).

Subjective symptom interview

A self-report questionnaire was used to assess subjective symptoms according to Riolo *et al.* [26], regarding pain in the jaws when functioning (e.g., chewing), unusually frequent headaches (i.e., more than once a week and of unknown etiology), stiffness/tiredness in the jaws, difficulty opening one’s mouth, grinding of the teeth and sounds from the TMJ. Each question could be answered with a “yes” or a “no.”

Moreover, three specific questions (yes/no) of the RDC/TMD Axis II were considered for further TMD diagnosis [27, 28]: (1) *Have you had pain in the face, jaw, temple, in front of the ear or in the ear in the past month?*; (2) *Have you ever had your jaw lock or catch so that it won't open all the way?*; (3) *Was this limitation in jaw opening severe enough to interfere with your ability to eat?* The other questions of Axis II were not included due to difficulty to understand or inappropriate for children.

Clinical signs evaluation

The clinical signs of TMD were assessed using the RDC/TMD criteria (Axis I) described as follows [28, 29]:

Pain Site. To determine whether the present pain was ipsilateral to the pain provoked by the clinical examination of the masticatory muscles and during jaw function.

Mandibular Range of Motion (mm) and Associated Pain. Jaw-opening patterns. Corrected and uncorrected deviations in jaw excursions during vertical jaw opening. Vertical range of motion of the mandible. Extent of unassisted opening without pain, maximum unassisted opening and maximum assisted opening. Mandibular excursive movements. Extent of lateral and protrusive jaw excursions.

Temporomandibular Joint Sounds. Palpation of the TMJ for clicking, grating, and crepitus sounds during vertical, lateral and protrusive jaw excursions.

Muscle and Joint Palpation for Tenderness. Bilateral palpation of extraoral and intraoral masticatory and related muscles (n = 20 sites) and bilateral palpation of the TMJ (n = 4 joint sites).

The clinical evaluation selected individuals with at least one sign and one symptom of TMD [30], who were referred to as the TMD group in this present study. Subjects meeting the criteria for myofascial pain with or without limited opening (Axis I, Group 1a or 1b disorders) and/or for disc displacement with reduction, without reduction with limited opening or without reduction without limited opening (Axis I, Group 2a, 2b or 2c) or for arthralgia or arthritis (Axis I, Group 3a or 3b) were considered to have an RDC/TMD diagnosis (RDC/TMD diagnosis group) [28]. The control group consisted of individuals with no current signs or symptoms of TMD (supercontrols) or those without signs or

symptoms of TMD (control group) [14, 28]. This recruitment strategy was based on the principle that subjects belonging to different groups will almost certainly respond differently to the questionnaire [31]. If the questionnaire is valid, it must be sensitive to such differences.

Data analysis

Statistical analyses were performed using SPSS 9.0 (SPSS, Chicago, IL, USA) with a 5% significance level and normality was assessed using the Kolmogorov-Smirnov test. Since score distributions were asymmetrical, non-parametrical tests were used in the performed analyses.

Overall scores for each participant were calculated by summing the item codes, whereas the subscale scores were obtained by summing the codes for questions within the four health domains. Descriptive statistics were followed by bivariate analyses, which used (where appropriate) Chi-squared and Fisher's exact tests for a comparison of proportions and Mann-Whitney test for a comparison of the means of the continuous variables.

Intraexaminer reliability

Intraexaminer reliability calculations were performed on 20 individuals who participated in the Axis I assessment and the Axis II diagnosis interview. Only three questions (3, 14a, 14b) from the latter were used as required determinants for the Axis I diagnoses.

The two most commonly accepted methods for assessing the intraexaminer reliability were used [32]. When the clinical examination variable could be measured on a continuous scale, reliability was assessed by computing the intraclass correlation coefficient (ICC), using the one-way analysis of variance random effect parallel model [33]. The strength of the intra-examiner agreement was based on the following standards for ICC: <0.2, poor; 0.21-0.40, fair; 0.41-0.60, moderate; 0.61-0.80, substantial and 0.81-1.0, excellent to perfect [34]. The Kappa statistic (Cohen's Kappa, κ) was computed to assess the reliability when variables were measured with a categorical rating scale (e.g.,

yes/no). Kappa values above 0.8 were considered excellent, from 0.61 to 0.8 good, 0.41 to 0.6 acceptable, 0.21 to 0.40 regular and below 0.20 fair [35].

Validity

The validity of a questionnaire represents the degree to which it measures what it is meant to measure. Criterion validity was calculated by comparing the correlations between CPQ scores and pain scores (obtained from Question 3 of the RDC/TMD Axis II), using the Spearman's correlation coefficient. As pain was considered a variable only in the TMD patients, the relevant correlation coefficients were calculated only for the TMD groups.

Discriminant construct validity was evaluated by comparing the mean scale scores between TMD and control groups using the Mann–Whitney test. The magnitude of the difference between groups was assessed using the effect size (ES). This was derived from the mean difference in scores between the groups divided by the pooled SD of scores: a value of 0.2 was taken to be small, 0.5 to be moderate and 0.8 to be large [36]. Discriminant construct validity was also assessed by verifying the difference between RDC/TMD diagnosis (individuals in Group I, II or III diagnosis) and “supercontrol” groups (individuals with no current sign and symptom of TMD). Correlational construct validity was assessed by comparing the mean scores and global ratings of oral health and overall well-being using Spearman's correlation coefficient.

Internal reliability

Reliability can be defined as a measure of the internal consistency or homogeneity of the items. Two measures were used for the analysis of internal reliability; the corrected item total correlation and the Cronbach's alpha coefficient [37]. Values above 0.2 for the former and 0.7 for the latter can be acceptable [38]. Alphas were also calculated with each item deleted.

RESULTS

Descriptive statistics

A sample distribution of the evaluated characteristics (e.g., age, gender, TMD groups and CPQ scores) is shown in Table 1. Female children and preadolescents were more prevalent in TMD groups. Muscle tenderness and headaches were the most frequent signs and symptoms of TMD found in children and preadolescents, being observed more significantly in girls than in boys (Chi-squared test).

Intraexaminer reliability

Among the 20 subjects for the reliability study, there were 14 girls and 6 boys with an average age of 10.30 ± 1.78 years. Fourteen of the subjects complained of symptoms suggestive of TMD, while six were asymptomatic. In almost all subjects ($n=19$), at least one sign of TMD was observed. The frequency of individuals with RDC/TMD diagnosis was 10% for muscle tenderness and 5% for disc displacements, respectively.

Table 2 shows the intraexaminer reliability for the clinical examinations and diagnostic questions of RDC/TMD. The ICC and Kappa values for the former ranged from 0.49 to 0.74, indicating a moderate to substantial agreement and from 0.30 to 0.96, indicating a regular to excellent agreement, respectively. High levels of reliability were found for all three questions of the Axis II, with kappa values ranging from 0.70 to 0.81.

Criterion validity

Table 3 shows the correlations between the scores of the different subscales and variable pain, which was the sum of the positive responses to question number 3 of the RDC/TMD Axis II, *“Have you had pain in the face, jaw, temple, in front of the ear or in the ear in the past month?”* There were positive correlations between the CPQ₁₁₋₁₄ total scores and variable pain ($r=0.32$, $p<0.0001$). Positive correlations were also observed between all of the domains of CPQ₁₁₋₁₄ and pain scores. There were no significant correlations observed between the scale and subscale CPQ₈₋₁₀ scores and variable pain, with the exception of the functional limitation subscale ($r=0.18$, $p<0.05$).

Table 1. Sample distribution in accordance with the evaluated characteristics - number of children (%).

	<i>Children</i>			<i>Preadolescents</i>		
	Boys	Girls	Total	Boys	Girls	Total
Number (%) [†]	113 (45.7)	134 (54.3)	247 (100.0)	122 (40.7) ^{**}	178 (59.3) ^{**}	300 (100.0)
Mean age + SD	9.0±0.8	9.1 ±0.8	9.0±0.8	12.2±1.2	12.1±1.1	12.1±1.1
<i>Clinical groups</i> [†]						
Group control	58 (54.7)	48 (45.3)	106 (42.9)	60 (48.4)	64 (51.6)	124 (41.3)
Group TMD	55 (39.0) [*]	86 (61.0) [*]	141 (57.1)	62 (35.2) ^{**}	114 (64.8) ^{**}	176 (58.7)
<i>RDC/TMD diagnostic groups</i> ^{†§}						
Group I: muscle disorder	5 (19.2) ^{**}	21 (80.8) ^{**}	26 (18.4)	12 (27.9) [*]	31 (72.1) [*]	43 (24.4)
Group II: disc displacements	0 (0.0)	1 (100.0)	1 (0.7)	0 (0.0)	5 (100.0)	5 (2.8)
Group III: arthralgia, arthritis, arthrosis	2 (40.0)	3 (60.0)	5 (3.5)	6 (28.6)	15 (71.4)	21 (11.9)
<i>Symptoms of TMD (self-report questionnaire)</i> ^{†§}						
Facial/jaw pain	14 (27.5) [*]	37 (72.5) [*]	51 (36.2)	23 (31.5) [*]	50 (68.5) [*]	73 (41.5)
Difficult in opening	16 (37.2)	27 (62.8)	43 (30.5)	16 (28.1) [*]	41 (71.9) [*]	57 (32.4)
Joint sounds	21 (46.7)	24 (53.3)	45 (31.9)	16 (41.0)	23 (59.0)	39 (22.2)
Teeth grinding	13 (29.5) [*]	31 (70.5) [*]	44 (31.2)	15 (34.9)	28 (65.1)	43(24.4)
Headache	34 (37.4)	57 (62.6)	91 (64.5)	42 (32.6) ^{**}	87 (67.4) ^{**}	129 (73.3)
<i>Signs of TMD (RDC/TMD Axis I)</i> ^{†§}						
Muscle tenderness	41 (37.6) [*]	68 (62.4) [*]	109 (77.3)	39 (33.1) ^{**}	79 (66.9) ^{**}	118 (67.0)
Joint pain	22 (31.9) [*]	47 (68.1) [*]	69 (48.9)	24 (30.4) ^{**}	55 (69.6) ^{**}	79 (44.9)

Limited mouth opening	12 (28.6) [*]	30 (71.4) [*]	42 (29.8)	17 (40.5)	25 (59.5)	42 (23.9)
Deviation in jaw excursions	18 (50.0)	18 (50.0)	36 (25.5)	16 (30.2) [*]	37 (69.8) [*]	53 (30.1)
TMJ sounds	2 (40.0)	3 (60.0)	5 (3.5)	2 (14.3)	12 (85.7)	14 (8.0)
<i>Perception of oral health</i>						
Mean CPQ score \pm SD [‡]	14.7 \pm 16.7 ^{***}	19.1 \pm 17.1 ^{***}	17.5 \pm 17.1	20.4 \pm 18.0	22.6 \pm 20.0	22.9 \pm 19.3

TMD, temporomandibular disorder; TMJ, temporomandibular joint; CPQ, child perceptions questionnaire

§ Results of TMD samples

† Chi-square test; ‡ Mann-Whitney test

*p<0.05; **p<0.01; *** p<0.001

Table 2. Intraexaminer reliability of diagnostic questions and clinical examinations of the RDC/TMD criteria (n=20).

RDC/TMD criteria	Reliability	
	Statistical tests	Interpretation
<i>Sign of TMD - Axis I</i>		
<i>Muscle tenderness</i>		
Extraoral myofascial sites (4-category variable) [†]	0.74	Substantial agreement
Intraoral myofascial sites (4-category variable) [†]	0.53	Moderate agreement
Jaw movements [*]	0.46	Acceptable agreement
<i>Joint pain</i>		
Palpation (4-category variable) [†]	0.67	Substantial agreement
Jaw movements [*]	0.96	Excellent agreement
<i>Range of motion</i>		
Vertical dimension (mm) [†]	0.68	Substantial agreement
Jaw excursions (mm) [†]	0.49	Moderate agreement
Jaw-opening pattern [*]	0.30	Regular agreement
<i>Joint sounds</i>		
Sound on jaw movement [*]	0.84	Excellent agreement
(Question) Symptom of TMD - Axis II [*]		
(3) Pain in facial area, the jaws or the jaw joint	0.81	Excellent agreement
(14a) Limitation in jaw opening	0.70	Good agreement
(14b) Diet restriction due to limitation in jaw opening	0.80	Good agreement

RDC/TMD, research diagnostic criteria for temporomandibular disorder

* Cohen's Kappa

† Intraclass correlation coefficient

Table 3. Criterion validity: correlations between the CPQ scores and variable pain (Question 3, RDC/TMD Axis II) for TMD groups.

TMD groups		Pain variable	
		r^a	P
CPQ ₈₋₁₀	Total scale	0.14	0.089
<i>n=141</i>	<i>Subscales</i>		
	Oral symptoms	0.13	0.106
	Functional limitations	0.18	0.024
	Emotional well-being	0.06	0.476
	Social well-being	0.09	0.278
CPQ ₁₁₋₁₄	Total scale	0.32	<0.0001
<i>n=176</i>	<i>Subscales</i>		
	Oral symptoms	0.33	<0.0001
	Functional limitations	0.26	0.000
	Emotional well-being	0.24	0.001
	Social well-being	0.27	0.000

TMD, temporomandibular disorder; CPQ, child perceptions questionnaire

^a Spearman's correlation coefficient

Discriminant construct validity

Children with signs and symptoms of TMD reported, on average, worse OHRQoL than the control group, as indicated by the mean overall scores of 20.6 versus 13.5, respectively (Table 4). The effect size of 0.43 indicated that the difference between the groups was moderate ($p<0.0001$). The CPQ₈₋₁₀ scores for the TMD group were also higher than in all subscales. When expressed as effect size, the magnitude of the mean differences was small to moderate. The mean score in the RDC/TMD diagnosis group (25.6 ± 22.3) was moderately higher than in the “supercontrol” group (7.5 ± 7.8) (Table 5). There were also significant differences between the groups for all the domains, with effect sizes ranging from moderate for functional ($ES=0.58$), emotional ($ES=0.50$) and social ($ES=0.54$) domains to large for the oral symptom subscale ($ES=0.87$).

Preadolescents in the TMD group had, on average, higher overall scores than in the control group (27.6 vs. 16.3; $p<0.0001$) (Table 4). The same difference was observed in all domains, with the mean functional and social well-being score being two times higher in the former than in the latter patient group: 6.5 vs. 3.6 ($p<0.0001$) and 5.9 vs. 2.9 ($p<0.0001$). The magnitude of the differences between the clinical groups was moderate, ranging from 0.46 in the oral symptoms domain to 0.62 in the functional limitations domain. When the scores for the RDC/TMD diagnosis groups were examined, preadolescents diagnosed with TMD had significantly higher scores than the “supercontrol” group for all total and subscale CPQ₁₁₋₁₄ scores (Mann-Whitney *U* test) (Table 5).

Table 4. Discriminant construct validity: a comparison between the CPQ mean scores of the TMD and control groups.

		<i>TMD group (n=141)</i>	<i>Control group (n=106)</i>	<i>P</i> [*]	<i>ES</i> [†]
		<i>Mean (SD)</i>	<i>Mean (SD)</i>		
CPQ ₈₋₁₀	Overall scale [0-100]	20.6 (17.7)	13.5 (15.4)	<0.0001	0.43
	<i>Subscales</i>				
	Oral symptoms [0-20]	7.2 (4.0)	5.2 (3.9)	<0.0001	0.55
	Functional limitations [0-20]	3.8 (4.2)	2.6 (3.8)	0.001	0.36
	Emotional well-being [0-20]	4.6 (4.7)	2.6 (4.1)	<0.0001	0.52
	Social well-being [0-40]	5.5 (7.4)	3.1 (5.9)	0.009	0.39
		<i>TMD group (n=176)</i>	<i>Control group (n=124)</i>	<i>P</i> [*]	<i>ES</i> [†]
		<i>Mean (SD)</i>	<i>Mean (SD)</i>		
CPQ ₁₁₋₁₄	Overall scale [0-148]	27.6 (20.7)	16.3 (14.8)	<0.0001	0.62
	<i>Subscales</i>				
	Oral symptoms [0-24]	7.0 (4.7)	5.2 (3.5)	<0.0001	0.46
	Functional limitations [0-26]	6.5 (5.6)	3.6 (4.2)	<0.0001	0.62
	Emotional well-being [0-36]	7.9 (7.6)	4.5 (5.6)	<0.0001	0.53
	Social well-being [0-52]	5.9 (6.7)	2.9 (4.0)	<0.0001	0.56

TMD, temporomandibular disorder; CPQ, child perceptions questionnaire

Values in square brackets indicate range of possible scores

* *P*-values obtained from Mann-Whitney test; † *ES* = Effect sizes, difference in group means/pooled SD

Table 5. Discriminant construct validity: CPQ overall and domain scores by the RDC/TMD diagnosis and “supercontrol” groups.

		<i>RDC/TMD Diagnosis</i>	<i>Supercontrol</i>	<i>P</i> [*]	<i>ES</i> [†]
		<i>Group (n=32)</i>	<i>Group (n=28)</i>		
		<i>Mean (SD)</i>	<i>Mean (SD)</i>		
CPQ ₈₋₁₀	Overall scale [0-100]	25.6 (22.3)	7.5 (7.8)	<0.0001	0.61
	<i>Subscales</i>				
	Oral symptoms [0-20]	8.7 (4.6)	3.5 (3.4)	<0.0001	0.87
	Functional limitations [0-20]	4.8 (4.7)	1.3 (1.9)	<0.0001	0.58
	Emotional well-being [0-20]	4.7 (5.2)	1.1 (1.7)	0.000	0.50
	Social well-being [0-40]	7.4 (9.6)	1.7 (3.1)	0.006	0.54
		<i>RDC/TMD Diagnosis</i>	<i>Supercontrol</i>	<i>P</i> [*]	<i>ES</i> [†]
		<i>Group (n=69)</i>	<i>Group (n=29)</i>		
		<i>Mean (SD)</i>	<i>Mean (SD)</i>		
CPQ ₁₁₋₁₄	Overall scale [0-148]	35.0 (24.1)	11.7 (9.6)	<0.0001	0.88
	<i>Subscales</i>				
	Oral symptoms [0-24]	8.7 (5.8)	4.2 (2.1)	<0.0001	0.74
	Functional limitations [0-26]	8.8 (7.0)	2.2 (2.9)	<0.0001	0.89
	Emotional well-being [0-36]	10.0 (8.9)	3.1 (4.1)	<0.0001	0.73
	Social well-being [0-52]	7.5 (6.8)	2.1 (3.4)	<0.0001	0.82

TMD, temporomandibular disorder; CPQ, child perceptions questionnaire

Values in square brackets indicate range of possible scores

* *P*-values obtained from Mann-Whitney test

† *ES* = Effect sizes, difference in group means/pooled SD

Correlational construct validity

As an index of construct validity, Spearman's correlation was highly significant at the 0.0001 level in both global ratings for CPQ₈₋₁₀ total scales in the TMD group (Table 6). Positive correlations were also observed between all the CPQ₈₋₁₀ subscale scores and global oral health ratings, as well as overall well-being.

The TMD group showed significant correlations between overall CPQ₁₁₋₁₄ scores and global oral health ratings ($p < 0.0001$) and overall well-being ($p < 0.0001$). Significant correlations were also observed between the scores for all CPQ₁₁₋₁₄ subscale scores and both global ratings (Table 6).

Table 6. Correlational construct validity: correlations between CPQ scores and global ratings of oral health and overall well-being (TMD groups).

TMD groups	CPQ ₈₋₁₀ (n=141)				CPQ ₁₁₋₁₄ (n=176)			
	Oral Health		Overall Well-being		Oral Health		Overall Well-being	
	R ^a	P ^b	R ^a	P ^b	R ^a	P ^b	R ^a	P ^b
Total scale	0.36	<0.0001	0.41	<0.0001	0.37	<0.0001	0.62	<0.0001
<i>Subscales</i>								
Oral symptoms	0.37	<0.0001	0.39	<0.0001	0.36	<0.0001	0.42	<0.0001
Functional limitations	0.25	0.002	0.41	<0.0001	0.28	0.000	0.48	<0.0001
Emotional well-being	0.44	<0.0001	0.38	<0.0001	0.34	<0.0001	0.57	<0.0001
Social well-being	0.28	0.000	0.36	<0.0001	0.26	0.000	0.53	<0.0001

TMD, temporomandibular disorder; CPQ, child perceptions questionnaire

Reliability

Internal consistency reliability was assessed for the TMD samples using Cronbach's alpha (Table 7). This was 0.93 for the total CPQ₈₋₁₀ and ranged from 0.68 to 0.90 for the subscales, indicating an acceptable to good level of internal consistency. For the overall CPQ₈₋₁₀ scale, the corrected item-total correlation coefficients were from 0.39 to 0.76 and for the domains the same coefficients ranged from 0.37 to 0.77. The alpha coefficients did not increase when any of the items were deleted.

A total of 176 TMD individuals were used to test the internal reliability of the CPQ₁₁₋₁₄ (Table 7). Cronbach's alpha for CPQ₁₁₋₁₄, as a whole, was excellent (0.94). For the domains of the CPQ₁₁₋₁₄, the coefficients ranged from 0.69 for oral symptoms to 0.90 for emotional well-being, indicating an acceptable to good levels of internal consistency reliability. The corrected item-total correlations for the total CPQ₁₁₋₁₄ scale ranged from

0.28 to 0.73. For the CPQ₁₁₋₁₄ subscales, the corrected item-total correlation coefficients ranged from 0.28, which represented the lower coefficient for the social well-being domain, to 0.76 for emotional well-being. The alpha was not higher when any item was deleted.

Table 7. Internal consistency reliability: Cronbach's alpha, Alpha if item deleted and Corrected item-total correlation (TMD groups).

TMD groups		Number of items	Cronbach's alpha	Range of α 's if items deleted	Range of corrected item total correlations
CPQ ₈₋₁₀ <i>n=141</i>	Total scale	25	0.93	(0.93-0.93)	(0.39-0.76)
	<i>Subscales</i>				
	Oral symptoms	5	0.68	(0.61-0.66)	(0.37-0.48)
	Functional limitations	5	0.78	(0.70-0.75)	(0.51-0.67)
	Emotional well-being	5	0.85	(0.81-0.83)	(0.60-0.71)
	Social well-being	10	0.90	(0.88-0.90)	(0.52-0.77)
CPQ ₁₁₋₁₄ <i>n=176</i>	Total scale	37	0.94	(0.93-0.94)	(0.28-0.73)
	<i>Subscales</i>				
	Oral symptoms	6	0.69	(0.62-0.68)	(0.33-0.51)
	Functional limitations	9	0.79	(0.76-0.78)	(0.40-0.57)
	Emotional well-being	9	0.90	(0.88-0.89)	(0.59-0.76)
	Social well-being	13	0.87	(0.85-0.87)	(0.28-0.67)

TMD, temporomandibular disorder; CPQ, child perceptions questionnaire

Discussion

This study was undertaken to provide evidence of the reliability and validity of the CPQ₈₋₁₀ and CPQ₁₁₋₁₄ in children and preadolescents with signs and symptoms of TMD. Our previous study had indicated that these measures were able to discriminate between children and preadolescents with different levels of severity of dental caries, malocclusion, fluorosis and gingivitis [22]. According to Locker *et al.* [39], the process of evaluating HRQoL measures consists of two stages; the first involves an assessment of the reliability and validity and the second consists of on-going evaluations of the performance in different

populations and the various contexts for which it was intended. Furthermore, the linguistic and cultural context in which a measure is used can have a bearing on the validity, as can the intended purpose of the measure; thus prior validity and reliability tests, the instruments must be translated, back-translated, and cross culturally adapted in order to ensure their conceptual and functional equivalences [22, 27, 31].

The RDC/TMD had been the best and most used classification system to date for epidemiological studies that sought to understand TMD etiology and mechanisms [40]. Together, Axis I and Axis II assessments constitute a comprehensive evaluation consistent with the biopsychosocial health model [2]. In this study, only three specific items for the latter were included, since they were more appropriate for the age sample. Accordingly, a questionnaire containing items regarding self-reported pain and associated symptoms of TMD [26] was used to replace the pain-related disability approach of RDC/TMD Axis II [41].

Reliability and validity are the basic underpinnings of any scientific measure. The reliability of a diagnostic instrument sets the upper limit for its validity [42]. Several studies evaluating the reliability of clinical findings have shown that the experiences and calibration of the examiners are crucial for accuracy of the results [32, 43, 44], as done in the present study. Individuals with most common TMD conditions as well as asymptomatic controls were included in the reliability assessment (n=20) to ensure that a broad spectrum, ranging from none to severe findings, was present [32, 45]. It provided a more realistically simulated actual clinical and research conditions, wherein patients and subjects who were both symptomatic and asymptomatic for TMD might actually appear to undergo RDC/TMD diagnostic examinations [46]. Other influencing factors included the feasibility of conducting such examinations in an acceptable time frame [46-48].

Considering the minimum acceptable level for agreement at 0.40 (kappa) for categorical measures and at 0.70 (ICC) for continuous variables [49], inconsistency was found in some RDC/TMD measurements, mainly in the pain scores and in the ranges of motion. However, the overall reliability results were still good. The poor intraoral muscle reliability found in the present study and by others [43, 47] could be explained by the low specificity of muscle palpation [50, 51]. Moreover, a low reproducibility for the pain scores

is not unusual because pain intensities do vary over even short periods of time [52] partly due to poor memory recall for pain [53]. Only a moderate level of reproducibility was found for jaw excursions, compared with other studies where more agreement was observed [43, 47]. In addition, differences in reliability findings may reflect variations in the methodology, such as differences in subject samples, numbers of examiners, study designs, statistical analyses, as well as prevalence and sampling variability [43, 46, 54].

Muscle tenderness was the most frequent clinical sign, found in 77.3% of children and 67% of preadolescents, agreeing with Tuerlings and Limme [55]. However, these results must be carefully considered given the low specificity of muscle palpation [50, 51]. The prevalence of joint pain was substantial, being the second most frequent sign observed in 48.9% of the children and 44.9% of the preadolescents, higher than values observed in adolescents by Bonjardim *et al.* [41] (7.83%-10.6%). The less prevalent sign of TMD were TMJ sounds, found in just 5% of the children and 8% of the preadolescents and even lower than those observed in previous studies [41, 56, 57]. The difference in findings may reflect variations in the tools being used. The high sensitivity of RDC/TMD classification for TMJ sounds, which is based on reproducible clicks on two of three trials, contributes to the elimination of indistinct or temporary clicking sounds [32], decreasing the probability of false positive results.

In TMD groups, the presence of headaches was higher in children than in preadolescents, as previously observed [41, 56, 58]. There was no gender difference in the symptomatic children, but among preadolescents, the prevalence of headaches associated with TMD was higher in girls than in boys. In line with these findings, previous studies found an increasing of this association with age among adolescents, especially in females [59, 60]. Similarly, the higher prevalence of the clinical signs of TMD, mainly painful signs among females, was consistent with some previous findings [57, 58, 61], whereas others found no gender-linked relationships [41, 62]. The difference between genders could probably be explained by the fact that girls may be more sensitive to tenderness and pain on palpation of the TMJ and adjacent muscles [63] mainly in older age due to hormonal changes [56, 61].

Ideally, criterion validity would be measured relative to a “gold standard.” As no such standard exists for oral health status measures, criterion validity was evaluated by correlating the CPQ scores with a score corresponding to the sum of the answers to the item investigating pain (Question 3, RDC/TMD Axis II). This approach is consistent with literature reports that suggest the use of external criteria to test criterion validity [31]. Subjects with pain-associated conditions presented higher impacts on daily function in this study and in others performed in adult [3, 12] and elderly [10] populations. Accordingly, the patients’ well-being decreased as a function of pain duration and increased in pain intensity, frequency and number of pain sites [12, 31]. In the only study to address this issue in youth patients, Jedel *et al.* [11] found that children and adolescents with TMD pain more than once a week were associated with higher impacts on physical functioning, emotional roles and behavioral roles, resulting in limitations on physical activities, school work and activities with friends. Similarly, positive correlations were observed between all the domains of CPQ₁₁₋₁₄ and pain scores for preadolescents. Although a substantial prevalence of pain symptoms existed in the CPQ₈₋₁₀ sample (36.2%), only the functional domain was associated with this variable. It is likely that reporting symptoms of minor severity or of fleeting nature resulted in such a high prevalence. Less severe pain and sensations may be responsible for less impaired OHRQoL in children reporting TMD. In fact, patients with TMD initially display functional limitations. These are followed by psychological discomfort, social disability and handicap and finally chronic pain [31]. This progression can also explain the different discriminant construct validity results, which compared the controls with both TMD groups and with the advanced cases.

The discriminant construct validity of the questionnaires was supported by their ability to detect differences in the impact on QoL, evidenced by the highest scores being seen in children and preadolescents with signs and symptoms of TMD. However, although the difference in scores supported the validity of the measures, the magnitude of these differences was only low to moderate. According to Reissmann *et al.* [14], the magnitude of TMD impact depends on the definition of the comparison group without TMD diagnoses. Although patients in the general population are the most plausible choice for comparison (which was chosen in the present study), they may have some signs and

symptoms of TMD; these are insufficient to warrant an RDC/TMD diagnosis but sufficient to influence QoL. This is consistent with the findings by Reissmann *et al.* [14], where subjects without diagnosis had a more than 50% higher OHRQoL impact levels compared to subjects without any TMD sign or symptom. Other authors suggest that differences in scores of QoL measures can be properly interpreted only after minimally important differences have been recognized [64]. The minimum important difference is defined as the smallest difference in scores that patients perceive as being important, which would suggest a change in the patient's management [65]. This score can be determined only following longitudinal studies in which some individuals changed and some did not, either as the result of therapy or natural fluctuations in the disorder. This evaluation has yet to be undertaken with respect to the measures used in this study.

Evidence that the higher scores of the TMD individuals may be important was found in the responses of the advanced cases when compared to the “supercontrol” reports. Analyses of the scores derived from both questionnaires indicated that the QoL of children and preadolescents diagnosed with TMD was markedly worse than that of individuals with no current signs or symptoms of TMD. These results were consistent with the higher impact found in adults diagnosed with TMD when compared with control groups in the study by Renner-Sitar *et al.* [15], which suggested that diagnoses associated with pain (e.g., myofascial pain, arthralgia) have a higher impact than non-pain-related diagnoses (e.g., disc displacement with reduction). Considering that muscle tenderness was the most frequent diagnosis observed among the evaluated TMD sample, greater impact on QoL was expected for these subjects.

The construct validity was further supported when the CPQ scores were assessed for the TMD groups against the global questions, as high correlations between them suggest that they are measuring the same construct. Moreover, these associations showed that the reported issues and concerns of the TMD groups extend beyond oral health and are of sufficient magnitude to have some effect on their life as a whole. It means that the questionnaires actually measured as originally intended [38].

Accepted minimal standards for internal reliability coefficients are 0.70 for group comparisons and 0.90–0.95 for individual comparisons [66]. Accordingly, the reliability

coefficients for both CPQ total and subscales exceeded standards for group and individual level comparisons [67], except for oral symptoms domains, which were slightly lower at 0.68 for CPQ₈₋₁₀ and at 0.69 for CPQ₁₁₋₁₄. However, these values can be acceptable, as they are far greater than 0.50, an indicative level for non-homogeneous scales [68]. According to Gherunpong *et al.* [59], alpha is not a perfect indicator of reliability, as it tends to underestimate the reliability of multidimensional scales and because lower values can be expected from health-related measures. All item-total correlations were above the minimum recommended level of 0.20 [19] and alpha did not increase when an item was deleted.

The greatest strength of this study is the use of the standardized OHRQoL questionnaires and also the standardized assessment of the level of impairment of different anatomical structures that constitute a stomatognathic system according to the RDC/TMD protocol [15]. Besides that, the recruitment strategy of sample allowed for a spectrum of participants, which provided a valid estimation of the differences between individuals with variety levels of severity of the same clinical condition, so that a judgement could safely be made concerning the generalisation of the results to that population [31]. On the other hand, it is also important to recognize the limitations of the work performed in terms of the methodology and analytic strategies used [69]. Given the cross-sectional nature of the data study, the observed finding could address only the descriptive and discriminative potential of OHRQoL measures in relation to TMD condition. Further research is required to determine whether or not these instruments discriminated between groups of children and adolescents with different clinical conditions. Studies should also include the measurement of factors that may account for the variation in OHRQoL observed in TMD patients, as well as, for other oral conditions. Finally, longitudinal studies are required to demonstrate OHRQoL responsiveness to change prior to using it in a context where change is expected, desired or possible [70].

Conclusions

The results of this study emphasize the importance of perceived health status and QoL assessment for evaluating TMD patients, since signs and symptoms of TMD can have a substantial functional, emotional and psychologic impact, negatively affecting the QoL of

children and preadolescents. Comparisons between individuals with different levels of the same condition clearly indicated the progressive aspects of the pathology that appear in advanced cases. Sufficient descriptive and discriminative psychometric properties of CPQ in TMD populations make these instruments suitable for assessing OHRQoL in cross-sectional studies. Finally, further studies are required to confirm the evaluative potential of these measures in this clinical and age-specific population.

Abbreviations

Child Perceptions Questionnaire (CPQ)

Child Perceptions Questionnaire 8-10 years (CPQ₈₋₁₀)

Child Perceptions Questionnaire 11-14 years (CPQ₁₁₋₁₄)

Cohen's Kappa (κ)

Effect size (ES)

Health-related quality of life (HRQoL)

Intraclass correlation coefficient (ICC)

Oral health-related quality of life (OHRQoL)

Quality of life (QoL)

Research Diagnostic Criteria for temporomandibular disorder (RDC/TMD)

Temporomandibular disorder (TMD)

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

TSB participated in conception and design of the study, data analysis and interpretation, acquisition of data and drafting the manuscript. MSL contributed to the data collection. PMC made critical comments on the manuscript. MBDG participated in the conception and design of the study and critical revision of manuscript. All authors read and approved the final manuscript.

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References

1. Suvinen TI, Reade PC, Kemppainen P, Könönen M, Dworkin SF: **Review of aetiological concepts of temporomandibular pain disorder: towards a biopsychosocial model for integration of physical disorder factors with psychological and psychosocial illness impact factors.** *Eur J Pain* 2005, **9**:613-633.
2. Gatchel RJ, Peng YB, Peters ML, Fuchs PN, Turk DC: **The biopsychosocial approach to chronic pain: scientific advances and future directions.** *Psychol Bull* 2007, **133**:581-624.
3. Barros V de M, Seraidarian PI, Côrtes MI, de Paula LV: **The impact of orofacial pain on the quality of life of patients with temporomandibular disorder.** *J Orofac Pain* 2009, **23**:28-37.
4. Barbosa Tde S, Miyakoda LS, Pocztaruk Rde L, Rocha CP, Gavião MB: **Temporomandibular disorders and bruxism in childhood and adolescence: review of the literature.** *Int J Pediatr Otorhinolaryngol* 2008, **72**:299-314.
5. Castelo PM, Gavião MB, Pereira LJ, Bonjardim LR: **Relationship between oral parafunctional/nutritive sucking habits and temporomandibular joint dysfunction in primary dentition.** *Int J Paediatr Dent* 2005, **15**:29-36.
6. Pereira LJ, Pereira-Cenci T, Del Bel Cury AA, Pereira SM, Pereira AC, Ambosano GM, Gavião MB: **Risk indicators of temporomandibular disorder incidences in early adolescence.** *Pediatr Dent* 2010, **32**:324-328.
7. Gonçalves DA, Dal Fabbro AL, Campos JA, Bigal ME, Speciali JG: **Symptoms of temporomandibular disorders in the population: an epidemiological study.** *J Orofac Pain* 2010, **24**:270-278.

8. Farsi N, Alamoudi N, Feteih R, El-Kateb M: **Association between temporomandibular disorders and oral parafunctions in Saudi children.** *Odontostomatol Trop* 2004, **27**:9-14.
9. Dahlström L, Carlsson GE: **Temporomandibular disorders and oral health-related quality of life. A systematic review.** *Acta Odontol Scand* 2010, **68**:80-85.
10. Graue M, Wentzel-Larsen T, Hanestad BR, Båtsvik B, Sjøvik O: **Measuring self-reported, health-related, quality of life in adolescents with type 1 diabetes using both generic and disease-specific instruments.** *Acta Paediatr* 2003, **92**:1190-1196.
11. Jedel E, Carlsson J, Stener-Victorin E: **Health-related quality of life in child patients with temporomandibular disorder pain.** *Eur J Pain* 2007, **11**:557-563.
12. Murray H, Locker D, Mock D, Tenenbaum HC: **Pain and the quality of life in patients referred to a craniofacial pain unit.** *J Orofac Pain* 1996, **10**:316-323.
13. Locker D, Grushka M: **The impact of dental and facial pain.** *J Dent Res* 1987, **66**:1414-1417.
14. Reissmann DR, John MT, Schierz O, Wassell RW. **Functional and psychosocial impact related to specific temporomandibular disorder diagnoses.** *J Dent* 2007, **35**:643-650.
15. Rener-Sitar K, Celebić A, Stipetić J, Marion L, Petricević N, Zaletel-Kragelj L: **Oral health related quality of life in Slovenian patients with craniomandibular disorder.** *Coll Antropol* 2008, **32**:513-517.
16. Luo Y, McMillan AS, Wong MC, Zheng J, Lam CL: **Orofacial pain conditions and impact on quality of life in community-dwelling elderly people in Hong Kong.** *J Orofac Pain* 2007, **21**:63-71.
17. Jokovic A, Locker D, Stephens M, Kenny D, Thompson B, Guyatt G: **Validity and reliability of a questionnaire for measuring child oral-health-related quality of life.** *J Dent Res* 2002, **81**:459-463.
18. Jokovic A, Locker D, Thompson B, Guyatt G: **Questionnaire for measuring oral health-related quality of life in eight- to ten year- old children.** *Pediatr Dent* 2004, **26**:512-518.

19. Gherunpong S, Tsakos G, Sheiham A: **Developing and evaluating an oral health-related quality of life index for children; The CHILD-OIDP.** *Community Dental Health* 2004, **21**:161-169.
20. Pahel BT, Rozier RG, Slade GD: **Parental perceptions of children's oral health: the Early Childhood Oral Health Impact Scale (ECOHIS).** *Health Qual Life Outcomes* 2007, **5**:6.
21. Broder HL, Wilson-Genderson M: **Reliability and convergent and discriminant validity of the Child Oral Health Impact Profile (COHIP Child's version).** *Community Dent Oral Epidemiol* 2007, **35**:20-31.
22. Barbosa TS, Tureli MCM, Gavião MBD: **Validity and reliability of the Child Perceptions Questionnaires applied in Brazilian children.** *BMC Oral Health* 2009, **9**:13.
23. Sheiham A, Maizels JE, Cushing AM: **The concept of need in dental care.** *Int Dent J* 1982, **32**:265-270.
24. Locker D: **Health outcomes of oral disorders.** *Int J Epidemiol* 1995, **24**:85-89.
25. Pereira LJ, Pereira-Cenci T, Pereira SM, Cury AA, Ambrosano GM, Pereira AC, Gavião MB: **Psychological factors and the incidence of temporomandibular disorder in early adolescence.** *Braz Oral Res* 2009, **23**:155-160.
26. Riolo ML, Brandt D, TenHave TR: **Associations between occlusal characteristics and signs and symptoms of TMJ dysfunction in children and young adults.** *Am J Orthod Dentofacial Orthop* 1987, **92**:467-477.
27. de Lucena LB, Kosminsky M, da Costa LJ, de Góes PS: **Validation of the Portuguese version of the RDC/TMD Axis II questionnaire.** *Braz Oral Res* 2006, **20**:312-317.
28. Dworkin SF, LeResche L: **Research diagnostic criteria for temporomandibular disorder: review, criteria, examinations and specifications, critique.** *J Craniomandib Disord* 1992, **6**:301-355.
29. Pereira FJ, Favilla EE, Dworkin SF, Huggins KH: **Crítérios de diagnóstico para pesquisa das desordens temporomandibulares RDC/TMD** [<http://www.rdc-tmdinternational.org/translations/frmtranslations.htm>]

30. Bonjardim LR, Gaviao MB, Carmagnani FG, Pereira LJ, Castelo PM. **Signs and symptoms of temporomandibular joint dysfunction in children with primary dentition.** *J Clin Pediatr Dent* 2003, **28**:53-58.
31. Segù M, Collesano V, Lobbia S, Rezzani C: **Cross-cultural validation of a short form of the Oral Health Impact Profile for temporomandibular disorder.** *Community Dent Oral Epidemiol* 2005, **33**:125-130.
32. Dworkin SF, LeResche L, DeRouen T, Von Korff M: **Assessing clinical signs of temporomandibular disorder: reliability of clinical examiners.** *J Prosthet Dent* 1990, **63**:574-579.
33. Shrout PE, Fleiss JL: **Intraclass correlation: uses in assessing rater reliability.** *Psych Bull* 1979, **86**:420-428.
34. Kramer MS, Feinstein AR: **The biostatistics of concordance.** *Clin Pharmacol Ther* 1981, **29**:111-123.
35. Cohen J: **A coefficient of agreement for nominal scales.** *Educ Psychol Measurement* 1960, **20**:37-46.
36. Cohen J: *Statistical Power Analysis for the Behavioural Sciences*. Hillside, NJ: Lawrence Erlbaum Associates; 1988.
37. Cronbach LJ: **Coefficient alpha and the internal structure of tests.** *Psychometrika* 1951, **16**:297-334.
38. Streiner DL, Norman GR: *Health measurement scales. A practical guide to their development and use*. New York: Oxford University Press; 2000.
39. Locker D, Jokovic A, Tompson B, Prakash P: **Is the Child Perceptions Questionnaire for 11-14 year olds sensitive to clinical and self-perceived variations in orthodontic status?** *Community Dent Oral Epidemiol* 2007, **35**:179-185.
40. **International Consortium for RDC/TMD-based Research** [<http://www.rdc-tmdinternational.org>]
41. Bonjardim LR, Gavião MB, Pereira LJ, Castelo PM, Garcia RC: **Signs and symptoms of temporomandibular disorder in adolescents.** *Braz Oral Res* 2005, **19**:93-98.

42. Smith TW: **Measurement in health psychology research.** In *Foundations of Health Psychology*. Edited by Friedman HS, Silver RC. New York: Oxford University; 2007:19-51.
43. List T, John MT, Dworkin SF, Svensson P: **Recalibration improves inter-examiner reliability of TMD examination.** *Acta Odontol Scand* 2006, **64**:146-152.
44. Steenks MH, de Wijer A: **Validity of the Research Diagnostic Criteria for Temporomandibular Disorder Axis I in clinical and research settings.** *J Orofac Pain* 2009, **23**:9-16.
45. Lobbezoo F, van Selms MK, John MT, Huggins K, Ohrbach R, Visscher CM, van der Zaag J, van der Meulen MJ, Naeije M, Dworkin SF: **Use of the Research Diagnostic Criteria for Temporomandibular Disorder for multinational research: translation efforts and reliability assessments in The Netherlands.** *J Orofac Pain* 2005, **19**:301-308.
46. John MT, Dworkin SF, Mancl LA: **Reliability of clinical temporomandibular disorder diagnoses.** *Pain* 2005, **118**:61-9.
47. Wahlund K, List T, Dworkin SF: **Temporomandibular disorder in children and adolescents: reliability of a questionnaire, clinical examination, and diagnosis.** *J Orofac Pain* 1998, **12**:42-51.
48. White P, Lewith G, Prescott P: **The core outcomes for neck pain: validation of a new outcome measure.** *Spine* 2004, **29**:1923-1930.
49. Look JO, John MT, Tai F, Huggins KH, Lenton PA, Truelove EL, Ohrbach R, Anderson GC, Shiffman EL: **The Research Diagnostic Criteria For Temporomandibular Disorder. II: reliability of Axis I diagnoses and selected clinical measures.** *J Orofac Pain* 2010, **24**:25-34.
50. Stratmann U, Mokrys K, Meyer U, Kleinheinz J, Joos U, Dirksen D, Bollmann F: **Clinical anatomy and palpability of the inferior lateral pterygoid muscle.** *J Prosthet Dent* 2000, **83**:548-554.
51. Türp JC, Minagi S: **Palpation of the lateral pterygoid region in TMD – where is the evidence?** *J Dent*. 2001, **29**:475-483.

52. Ohrbach R, Turner JA, Sherman JJ, Mancl LA, Truelove EL, Schiffman EL, Dworkin SF: **The Research Diagnostic Criteria for Temporomandibular Disorder. IV: evaluation of psychometric properties of the Axis II measures.** *J Orofac Pain* 2010, **24**:48-62.
53. Jamison RN, Sbrocco T, Parris WC: **The influence of physical and psychosocial factors on accuracy of memory for pain in chronic pain patients.** *Pain* 1989, **37**:289-294.
54. Sousa LM, Nagamine HM, Chaves TC, Grossi DB, Regalo SC, Oliveira AS: **Evaluation of mandibular range of motion in Brazilian children and its correlation to age, height, weight, and gender.** *Braz Oral Res* 2008, **22**:61-66.
55. Tuerlings V, Limme M: **The prevalence of temporomandibular joint dysfunction in the mixed dentition.** *Eur J Orthod* 2004, **26**:311-320.
56. Farsi NM: **Symptoms and signs of temporomandibular disorder and oral parafunctions among Saudi children.** *J Oral Rehabil* 2003, **30**:1200-1208.
57. Sönmez H, Sari S, Oksak Oray G, Camdeviren H: **Prevalence of temporomandibular dysfunction in Turkish children with mixed and permanent dentition.** *J Oral Rehabil* 2001, **28**:280-285.
58. Thilander B, Rubio G, Pena L, de Mayorga C: **Prevalence of temporomandibular dysfunction and its association with malocclusion in children and adolescents: an epidemiologic study related to specified stages of dental development.** *Angle Orthod* 2002, **72**:146-154.
59. LeResche L, Mancl LA, Drangsholt MT, Saunders K, Korff MV: **Relationship of pain and symptoms to pubertal development in adolescents.** *Pain* 2005, **118**:201-209.
60. Nilsson IM, List T, Drangsholt M: **Prevalence of temporomandibular pain and subsequent dental treatment in Swedish adolescents.** *J Orofac Pain* 2005, **19**:144-150.
61. List T, Wahlund K, Wenneberg B, Dworkin SF: **TMD in children and adolescents: prevalence of pain, gender differences, and perceived treatment need.** *J Orofac Pain* 1999, **13**:9-20.

62. Nilsson IM, Drangsholt M, List T: **Impact of temporomandibular disorder pain in adolescents: differences by age and gender.** *J Orofac Pain* 2009, **23**:115-122.
63. Dao TT, LeResche L. **Gender differences in pain.** *J Orofac Pain* 2000, **14**:169-184.
64. Juniper G, Guyatt G, Willan A, Griffith L: **Determining a minimal important change in a disease-specific quality of life questionnaire.** *J Clin Epidemiol* 1994, **47**:81-87.
65. Jaeschke R, Singer J, Guyatt G: **Measurement of health status: ascertaining the minimal clinically important difference.** *Controlled Clin Trials* 1989, **10**: 407-415.
66. Scientific Advisory Committee of the Medical Outcomes Trust: **Assessing health status and quality-of-life instruments: attributes and review criteria.** *Qual Life Res* 2002, **11**:193-205.
67. Norman GR, Streiner DL: *PDQ statistics*. Louis: Mosby; 1996.
68. Bowling A: *Research Methods in Health: Investigating Health and Health Services*. Buckingham: Open University Press; 1997.
69. Li S, Veronneau J, Allison PJ: **Validation of a French language version of the Early Childhood Oral Health Impact Scale (ECOHIS).** *Health Qual Life Outcomes* 2008, **6**:9.
70. Li S, Malkinson S, Veronneau J, Allison PJ: **Testing responsiveness to change for the early childhood oral health impact scale (ECOHIS).** *Community Dent Oral Epidemiol* 2008, **36**:542-548.

CAPÍTULO 2

**Oral health-related quality of life in children and preadolescents with dental caries,
malocclusions or temporomandibular disorders**

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TAÍS DE SOUZA BARBOSA¹, PAULA MIDORI CASTELO², MARINA SEVERI
LEME¹, MARIA BEATRIZ DUARTE GAVIÃO¹

¹ Department of Pediatric Dentistry, Piracicaba Dental School, University of Campinas,
Piracicaba/SP, Brazil

² Department of Biological Sciences, Federal University of São Paulo, Diadema/SP, Brazil

E-mails:

tais_sb@yahoo.com

pcasteloferreira@hotmail.com

ma_leme@terra.com.br

mbgaviao@fop.unicamp.br

Correspond with:

Prof. Maria Beatriz Duarte Gavião

Faculdade de Odontologia de Piracicaba/UNICAMP – Departamento de Odontologia
Infantil – Área de Odontopediatria

Adress: Av. Limeira 901, Piracicaba/SP, Brasil / Zip code: 13414-903

Phone: 55 19 2106 5368/5287 – Fax: #55-19-21065218

E-mail: mbgaviao@fop.unicamp.br

ABSTRACT

Objectives: To compare oral health-related quality of life (OHRQoL) of children and preadolescents with different oral conditions and to identify concepts associated with their perceptions of oral health (OH) and overall well-being (OWB). **Material and Methods:** 264 children (8-10-yr-old) and preadolescents (11-14-yr-old) were examined for dental caries, malocclusions and signs and symptoms of temporomandibular disorders (TMD). OHRQoL was measured using Portuguese versions of Child Perceptions Questionnaires (CPQ). Participants were distributed into groups: dental caries (n = 72), malocclusion (n = 40), TMD (n = 89) and control (n = 63). Differences in CPQ scores and in the frequency of responses to global ratings of OH and OWB were assessed using Kruskal-Wallis and chi-square/Fisher's exact tests. Multiple linear regression analyses were used to identify items associated with CPQ and global scores. **Results:** OHRQoL of TMD group was statistically different from controls. Malocclusion group reported more oral symptoms and social impacts compared to controls. Clinical groups did not differ in terms of CPQ scores and global ratings. The variables associated with CPQ scores varied according to clinical condition affecting children and preadolescents. **Conclusions:** The questionnaires discriminated between clinical groups and controls. The items associated with higher OHRQoL scores were mainly psychosocial for dental caries and TMD groups, physical functional and psychosocial for children and preadolescents with malocclusions, respectively. Children and preadolescents viewed the health of their teeth and mouth and its impact on well-being as multidimensional concepts.

Key words: child, dental caries, malocclusion, oral health-related quality of life, preadolescent, temporomandibular disorder

INTRODUCTION

Oral health-related quality of life (OHRQoL) measures the functional and psychosocial outcomes of oral disorders, and it functions as an important clinical indicator when assessing the oral health of individuals and populations, making treatment decisions, or evaluating dental interventions, services and programs. In this context, children and

adolescents have been also been examined as a population. Similar to adults, children and adolescents are also affected by several oral and orofacial disorders that have the potential to limit their physical functionality, psychosocial well-being and quality of life (QoL) [1]. The oral and orofacial disorders that affect children range from common conditions, such as dental caries and malocclusions, to less frequent conditions, such as temporomandibular disorders (TMD).

A recent epidemiological survey performed in Brazil found a dmft mean (decayed, missing and filled in the primary dentition) of 2.3 for 5-year-old children and a DMFT mean (decayed, missing and filled teeth in the permanent dentition) of 1.2 for 12-yr-old preadolescents [2]. Considering recent studies performed in South-East region of Brazil, 37.8% of 5-year-old children [3] and 48% of 12-yr-old preadolescents [4] have experienced dental decay. Of 407 schoolchildren aged 9 to 12 years, one-third exhibit a definite need for orthodontic treatment [5]. Although the prevalence of signs and symptoms of TMD varies widely in the literature [6], recent estimates indicate that approximately 5% of 12-year-old Brazilian preadolescents met the Research Diagnostic Criteria for TMD (RDC/TMD) when examined [7]. Because dental caries and malocclusions are more clinically frequent, there have been several studies regarding the impacts of these conditions on the physical functionality and psychosocial well-being of pediatric dentistry and orthodontic patients [1]; in contrast, fewer studies have been performed that examine the OHRQoL of children and adolescents with signs and symptoms of TMD [8, 9]. In addition, assessment of the impacts of oral disorders on children's everyday life is important as oral disorders may not only limit their current functioning and psychosocial well-being, but may also compromise their future development and achievements.

Measures have been developed specifically for assessing the OHRQoL of children and adolescents [10-13]. Child Perceptions Questionnaires (CPQ) are age-specific self-report scores that measure the negative effects that oral and orofacial conditions may have on the well-being of 8- to 10-year-old children (CPQ₈₋₁₀) [11] and 11- to 14-year-old preadolescents (CPQ₁₁₋₁₄) [12]. CPQ have been extensively used in different countries and cultures, such as United Kingdom [14], Saudi Arabia [15], China [16], Denmark [17] and Germany [18], to assess children and adolescents who present with a wide variety of oral

and orofacial conditions. Although our previous study indicated that the two age-specific versions of the CPQ were able to discriminate between Brazilian children and preadolescents with different levels of severity for the same clinical condition [19], further examination of the CPQ in specific clinical populations was necessary. Consequently, a cross-sectional study was undertaken in order to compare the OHRQoL of 8- to 14-year-old children and preadolescents with dental caries, malocclusions or signs and symptoms of TMD. This study aimed to determine if the CPQ were able to discriminate between groups with different clinical conditions and control individuals. An additional aim was to explore the concepts that children and preadolescents in each clinical group integrated into their CPQ responses in regards to global oral health ratings and the extent to which their oral conditions affected their overall well-being.

MATERIALS AND METHODS

Participants

The sample size was calculated based on the prevalence of dental caries reported in previous studies carried out in Piracicaba-São Paulo, Brazil [4]. To calculate the sample size, a mean of 1.32 DMFT, a standard deviation (SD) of 1.92, a sampling error of 20% and a confidence level of 95% were used. A correction factor of 1.2 was used to increase the precision [20]. Thus, the minimal sample size required to satisfy the requirements was estimated to be 203 individuals. However, this number was increased by 20.0% ($n = 244$) to compensate for possible refusals. A total of 264 public school students (132 boys and 132 girls), aged 8 to 14 years that did not have any systemic diseases or communication and/or neuromuscular problems participated in the study. All students obtained parental consent prior to participation. Children with the following conditions were excluded from the study: facial traumatism; neurological or psychiatric disorders; use of dental prostheses; current use of medications, such as antidepressants, muscle relaxants, narcotics or non-steroidal anti-inflammatory drugs; and previous or present orthodontic treatment and other orofacial pain conditions that could interfere with TMD diagnosis. This study was approved

by the Research Ethics Committee of the Dental School of Piracicaba, State University of Campinas (protocol number 021/2006).

Data collection

Dental caries and malocclusion

Participants were clinically examined for dental caries and malocclusions by two examiners; examiners utilized the WHO Oral Health Surveys: Basic Methods criteria for patient evaluation [21]. Inter-examiner agreement for diagnosis of dental caries and malocclusions was satisfactory (Kappa values were 0.96 and 0.88, respectively). All examinations were performed outside of the school during the day and were conducted outside of direct sunlight.

Dental caries for each participant was assessed using the sum of decayed, missing, and filled teeth in the primary (dmft) and permanent dentitions (DMFT) indices [21]. Teeth were marked as 'decayed' when any of the following were observed: unmistakable cavitations on the occlusal, buccal or lingual walls; a detectable softened floor or wall; carious roots or a filled tooth with signs of caries. When in doubt, teeth were recorded as sound. Teeth extracted due to caries were marked as 'missing' [21].

Malocclusions were scored using the Dental Aesthetic Index (DAI) [22], which assesses the relative social acceptability of dental appearance by collecting and weighing data on 10 intraoral measurements using the following equation: $6 \times (\text{missing visible teeth}) + \text{crowding} + \text{spacing} + 3 \times (\text{diastema}) + \text{largest anterior maxillary irregularity} + \text{largest anterior mandibular irregularity} + 2 \times (\text{anterior maxillary overjet}) + 4 \times (\text{anterior mandibular overjet}) + 4 \times (\text{vertical anterior open bite}) + 3 \times (\text{anteroposterior molar relation}) + 13$. This enabled each individual to be placed on a dental appearance continuum, ranging from 13 (the most socially acceptable) to 100 (the least socially acceptable); orthodontic treatment needs can be then prioritized based on the predefined categories of none/minor (scores from 13 to 25), definite (26 to 31), severe (32 to 35), or handicapping (36 or more) [23].

Signs and symptoms of TMD

Clinical signs of TMD were assessed using the RDC/TMD criteria [24] that included examination of the following symptoms and parameters: pain on palpation, mandibular range of motion (mm), jaw opening-associated pain, jaw opening pattern, unassisted opening, maximum assisted opening, mandibular excursive and protrusive movements, TMJ-derived sounds, and tenderness induced by muscle and joint palpation. A self-report questionnaire designed by Riolo *et al.* [25] was used to assess the subjective symptoms of TMD, regarding pain in the jaws when chewing, unusually frequent headaches (more than once a week and of unknown etiology), stiffness/tiredness in the jaws, difficulty in opening the mouth wide, grinding teeth, and sounds from the TMJ. Each question could be answered with “yes” or “no”. Individuals with at least one sign and one symptom were classified as TMD patients [26].

Prior to clinical examination, one dental examiner (TSB) participated in a training process to learn the RDC/TMD criteria [24]; the training was divided into theoretical discussions focusing on practical activities as well as the codes and criteria for the study. Intra-examiner reliability was investigated by conducting repeat examinations on 20 individuals one week later; good reliability agreement was observed.

Oral health-related quality of life

Data were collected using the Portuguese versions of the CPQ for individuals aged 8–10 years (CPQ_{8–10}) and 11–14 years (CPQ_{11–14}) [19]. These questionnaires were designed to examine the impact of oral conditions on the QoL of children and adolescents [10, 11]. Both questionnaires were self-completed. CPQ items used Likert-type scales with response options of never = 0, once or twice = 1, sometimes = 2, often = 3 and everyday or almost everyday = 4. For the CPQ_{11–14}, the recall period was 3 months; for the CPQ_{8–10}, the period of recall was 4 weeks. Items were grouped into four domains: oral symptoms (OS), functional limitations (FL), emotional well-being (EW) and social well-being (SW). A high score indicates more negative impact on QoL.

Participants were also asked to provide global assessments of their oral health (OH) and the extent to which their oral condition(s) affected their overall well-being (OWB).

These questions preceded the multi-item scales in the questionnaires. A 4-point response format was used for both OH and OWB assessment. For OH, the point scale ranged from “very good” = 0 to “poor” = 3, while for the OWB assessment, the point scale ranged “not at all” = 0 to “a lot” = 3. In CPQ₁₁₋₁₄, these global ratings had a five-point response format ranging from “excellent” = 0 to “poor” = 4 for oral health, and from “not at all” = 0 to “very much” = 4 for well-being, respectively.

Within the two major age-specific groups (CPQ₈₋₁₀ and CPQ₁₁₋₁₄) participants were divided into the following four subgroups according to their oral condition: dental caries (with DMFT \geq 1), malocclusion (with DAI \geq 26), TMD (with at least one sign and one symptom of TMD) or control (DMFT = 0, DAI < 26 and without signs and symptoms of TMD). Participants in each clinical group presented only with that specific clinical condition; for example, participants in the dental caries group had only tooth decay and were free from malocclusions or TMD. This criterion was enforced for each of the clinical groups, including the control group, whose participants did not exhibit any of these oral diseases.

Statistical analysis

Statistical analysis was performed using SPSS 9.0 (SPSS, Chicago, IL, USA) with a 5% significance level; normality was assessed using the Kolmogorov-Smirnov test. Because the score distributions were asymmetrical, non-parametric tests were used in the analyses performed. Where appropriate, chi-square and Fisher's exact tests were used to verify the sample distribution according to gender and age-specific groups. Differences in CPQ overall and domain scores between the different clinical groups and between the clinical and control groups were assessed using the Kruskal-Wallis test. Multiple linear regression analyses using forward stepwise entry procedures were used to identify the items associated with overall CPQ scores and the global ratings of OH and OWB in accordance with each clinical group. Initially, all items were entered into the model, then the least significant items were regressively dropped until only those with $p < 0.05$ remained in the model.

RESULTS

Sample characteristics

A sample distribution of the clinical characteristics according to gender and age-specific group is shown in Table 1.

CPQ overall and domain scores

The mean CPQ₈₋₁₀ total score was highest in the TMD group and lowest in the control group ($p < 0.01$) (Table 2). Children in the TMD and malocclusion groups had significantly higher mean OS domain scores compared to children in the control group ($p < 0.01$). The CPQ₈₋₁₀ total and domain scores were highest in the TMD group, lower in the malocclusion group and lowest in the dental caries group; however, the differences between these groups were not statistically significant.

Preadolescents with TMD had significantly higher mean CPQ₁₁₋₁₄ overall scores compared to preadolescents in the dental caries ($p < 0.05$) and control groups ($p < 0.01$) (Table 2). The mean CPQ₁₁₋₁₄ OS and EW domain scores were highest in the TMD group and lowest in the control group ($p < 0.01$). The TMD and malocclusion groups had significantly higher mean SW domain scores compared with the control group. No significant differences in the CPQ₁₁₋₁₄ domain scores were observed between the dental caries, malocclusion and TMD groups.

Global ratings of oral health and overall well-being

There were no differences between the clinical and control groups regarding the number of responses to the questions concerning overall oral health ratings and overall well-being for both CPQ groups (Table 3). In the CPQ₈₋₁₀ respondents, about one tenth of the participants in the malocclusion and control groups indicated that their oral health was poor. No children with TMD and/or dental caries reported that the health of their teeth and mouth was poor. One third of preadolescents with TMD, caries or malocclusion(s) indicated that the health of their teeth or mouth was fair/poor, compared with 18.9% of

participants in the control group. Over half of the children and preadolescents reported that their oral condition had little or no effect on their overall quality of life (Table 3).

Items associated with CPQ overall scores

Tables 4 and 5 show the results of multiple linear regression models when the CPQ questions were used as the independent variables associated with overall CPQ scores. The questions that remained in the CPQ₈₋₁₀ models in both dental caries and TMD groups predominately concerned impacts on psychosocial well-being (Table 4). The CPQ₈₋₁₀ model for malocclusion group retained a total of four variables: three representing physical functional limitations and one representing social well-being. All regression coefficients except one were positive. The emotional question regarding shyness had a negative coefficient in TMD children ($\beta = -0.080$; $p < 0.05$).

The CPQ₁₁₋₁₄ models in both the dental caries and TMD groups retained thirteen and twenty-three variables, respectively; approximately half of these variables concerned physical functionality, while the other half focused on psychosocial well-being (Table 5). Nine questions remained in the CPQ₁₁₋₁₄ model for malocclusion group. Of these, three concerned physical functional limitations and six pertained to psychosocial well-being. All regression coefficients were positive except for four questions concerning psychosocial well-being; of these questions, one was in the dental caries group and three were in the TMD group.

Table 1. Clinical characteristics of the sample studied [n (%)] in accordance with gender and age-specific groups.

Group	Diagnosis	Children			Preadolescents		
		Male	Female	Total	Male	Female	Total
Dental caries	With one or more decayed teeth	11 (64.7)	6 (66.7)	17 (65.4)	12 (52.2)	12 (52.2)	24 (52.2)
	With one or more missing teeth	4 (23.5)	0 (0.0)	4 (15.4)	0 (0.0)	1 (4.3)	1 (2.2)
	With one or more filled teeth	8 (47.1)	5 (55.6)	13 (50.0)	17 (73.9)	18 (78.3)	35 (76.1)
Malocclusion	Missing tooth (one or more)	3 (23.1)	4 (36.4)	7 (29.2)	1 (20.0)	0 (0.0)	1 (6.3)
	Crowding (one or two segments)	5 (38.5)	10 (90.9)	15 (62.5)	5 (100.0)	11 (100.0)	16 (100.0)
	Spacing (one or two segments)	10 (76.9)	3 (27.3)	13 (54.2)	1 (20.0)	2 (18.2)	3 (18.8)
	Median diastema (> 2mm)	3 (23.1)	2 (18.2)	5 (20.8)	1 (20.0)	1 (9.1)	2 (12.5)
	Upper anterior crowding (\geq 2mm)	2 (15.4)	7 (63.6)	9 (37.5)	3 (60.0)	5 (45.5)	8 (50.0)
	Upper anterior crowding (\geq 2mm)	1 (7.7)	3 (27.3)	4 (16.7)	5 (100.0)	3 (27.3)	8 (50.0)
	Anterior maxillary overjet (\geq 4mm)	7 (53.8)	4 (36.4)	11 (45.8)	3 (60.0)	6 (54.5)	9 (56.3)
	Anterior mandibular overjet (\geq 4mm)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Anterior open bite (> 2mm)	1 (7.7)	1 (9.1)	2 (8.3)	0 (0.0)	1 (9.1)	1 (6.3)
	Molar relation (half or one cuspid)	8 (61.5)	8 (72.7)	16 (66.7)	3 (60.0)	6 (54.5)	9 (56.3)
TMD	<i>Signs of TMD</i>						
	Muscle tenderness	13 (92.9)	15 (78.9)	28 (84.8)	15 (62.5)	23 (71.9)	38 (67.9)
	Joint pain	7 (50.0)	6 (31.6)	13 (39.4)	10 (41.7)	14 (43.8)	24 (42.9)
	Limited mouth opening	3 (21.4)	5 (26.3)	8 (24.2)	2 (8.3)	6 (18.8)	8 (14.3)
	Deviation in jaw excursions	5 (37.5)	2 (10.5)	7 (21.2)	4 (16.7)	8 (25.0)	12 (21.4)

TMJ sounds	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (9.4)	3 (5.4)
<i>Symptoms of TMD</i>						
Facial/jaw pain	8 (57.1)	8 (42.1)	16 (48.5)	9 (37.5)	16 (50.0)	25 (44.6)
Difficult in opening	4 (28.6)	6 (31.6)	10 (30.3)	5 (20.8)	12 (37.5)	17 (30.4)
Joint sounds	7 (50.0)	1 (5.3)	8 (24.2)	6 (25.0)	5 (15.6)	11 (19.6)
Teeth grinding	2 (14.3)	6 (31.6)	8 (24.2)	4 (16.7)	7 (21.9)	11 (19.6)
Headache	6 (42.9)	13 (68.4)	19 (57.6)	16 (66.7)	22 (68.8)	38 (67.9)

TMD, temporomandibular disorder

p>0.05 (Chi-Square and Fisher's exact tests)

Table 2. Differences in mean CPQ overall and domain scores among clinical groups.

		Clinical groups			
		Dental caries	Malocclusion	TMD	Control
		(n=26)	(n=24)	(n=33)	(n=26)
CPQ ₈₋₁₀	Overall scale [0-100]	12.8 (12.1) ^{ab}	14.8 (15.1) ^{ab}	17.4 (12.7) ^a	9.6 (10.6) ^b
	<i>Subscales</i>				
	Oral symptoms [0-20]	5.1 (3.6) ^{ab}	6.2 (4.4) ^a	6.2 (3.1) ^a	3.6 (3.1) ^b
	Functional limitations [0-20]	2.7 (3.2)	2.8 (4.1)	3.3 (3.2)	1.5 (2.8)
	Emotional well-being [0-20]	2.7 (3.7)	2.5 (3.7)	4.2 (4.3)	3.5 (3.9)
	Social well-being [0-40]	2.3 (3.6)	3.3 (5.6)	3.6 (5.2)	2.0 (3.0)
		Dental caries	Malocclusion	TMD	Control
		(n=46)	(n=16)	(n=56)	(n=37)
CPQ ₁₁₋₁₄	Overall scale [0-148]	16.1 (12.1) ^b	19.4 (19.6) ^{ab}	24.4 (20.3) ^a	10.6 (7.5) ^b
	<i>Subscales</i>				
	Oral symptoms [0-24]	5.2 (2.8) ^{ab}	5.5 (5.0) ^{ab}	6.8 (3.9) ^a	4.3 (2.6) ^b
	Functional limitations [0-26]	3.8 (3.9)	4.1 (5.6)	5.7 (6.0)	2.6 (3.0)
	Emotional well-being [0-36]	4.0 (4.1) ^{ab}	5.6 (5.6) ^{ab}	7.0 (7.2) ^a	2.5 (3.2) ^b
	Social well-being [0-52]	3.1 (3.5) ^{ab}	4.1 (5.7) ^a	4.8 (5.8) ^a	1.2 (1.8) ^b

CPQ, child perceptions questionnaire; TMD, temporomandibular disorder

Values in square brackets indicate range of possible scores

Values followed by same letter do not differ statistically (Kruskal–Wallis test, $p>0.05$)

Table 3. Responses to the global ratings of oral health and overall well-being by clinical groups.

		Clinical groups			
		Dental caries, %	Malocclusion, %	TMD, %	Control, %
Global ratings		(n=26)	(n=24)	(n=33)	(n=26)
CPQ ₈₋₁₀	<i>Oral health</i>				
	Very good	38.5	37.5	36.4	50.0
	Good	34.6	29.2	30.3	23.1
	O.K.	26.9	25.0	33.3	15.4
	Poor	0.0	8.3	0.0	11.5
	<i>Overall well-being</i>				
	Not at all	57.7	54.2	45.5	73.1
	A little bit	30.8	20.8	39.4	23.1
	Some	19.2	16.7	9.1	3.8
	A lot	0.0	8.3	6.1	0.0
		Dental caries, %	Malocclusion, %	TMD, %	Control, %
		(n=46)	(n=16)	(n=56)	(n=37)
CPQ ₁₁₋₁₄	<i>Oral health</i>				
	Excellent	4.3	6.3	10.7	16.2
	Very good	26.1	18.8	23.2	35.1
	Good	41.3	43.8	32.1	29.7
	Fair/Poor	28.3	31.3	33.9	18.9
	<i>Overall well-being</i>				
	Not at all	63.0	68.8	42.9	67.6
	Very little	21.7	18.8	33.9	21.6
	Some	13.0	6.3	14.3	10.8
	A lot/Very much	2.2	6.3	8.9	0.0

CPQ, child perceptions questionnaire; TMD, temporomandibular disorder

p>0.05 (Chi-Square and Fisher's exact tests)

Table 4. Results of the forward stepwise linear regression analysis: items associated with clinical group CPQ₈₋₁₀ overall scores.

	Domain	β	t	P
<i>Dependent variable: CPQ₈₋₁₀ score in dental caries group^a</i>				
Worried you are less attractive than others	EW	0.176	4.277	<0.001
Difficulty doing homework	SW	0.194	5.550	<0.001
Worried what other people think	EW	0.134	3.569	<0.01
Difficulty eating foods would like to eat	FL	0.192	4.854	<0.001
Avoid smiling when around other children	SW	0.281	7.427	<0.001
Difficulty chewing firm foods	FL	0.161	4.567	<0.001
Frustrated	EW	0.115	3.177	<0.01
Food stuck between teeth	OS	0.108	3.378	<0.01
Had hard time paying attention in school	SW	0.136	3.938	<0.01
Difficulty drinking/eating hot/cold foods	OS	0.069	2.139	<0.05
<i>Dependent variable: CPQ₈₋₁₀ score in malocclusion group^b</i>				
Unclear speech	FL	0.567	11.732	<0.001
Difficulty chewing firm foods	FL	0.282	4.088	<0.01
Pain in teeth/mouth	OS	0.261	5.951	<0.001
Difficulty doing homework	SW	0.188	3.162	<0.01
<i>Dependent variable: CPQ₈₋₁₀ score in TMD group^c</i>				
Not wanted to talk to other children	SW	0.424	12.216	<0.001
Worried you are less attractive than others	EW	0.178	6.251	<0.001
Difficulty eating foods would like to eat	FL	0.200	7.304	<0.001
Had hard time paying attention in school	SW	0.064	2.491	<0.05
Difficulty chewing firm foods	FL	0.068	2.824	<0.01
Teased/called names by other children	SW	0.183	6.620	<0.001
Frustrated	EW	0.106	3.160	<0.01
Pain in teeth/mouth	OS	0.098	4.570	<0.001
Not wanted to speak/read aloud in class	SW	0.087	3.255	<0.01
Worried what other people think	EW	0.130	3.686	<0.01
Mouth sores	OS	0.055	2.511	<0.05
Shy	EW	-0.080	-2.402	<0.05

CPQ, child perceptions questionnaire; TMD, temporomandibular disorder; OS, oral symptoms; FL, functional limitations, EW, emotional well-being; SW, social well-being

^a $R^2=0.993$; $F=203.52$; $P<0.001$

^b $R^2=0.971$; $F=157.97$; $P<0.001$

^c $R^2=0.995$; $F=302.76$; $P<0.001$

Table 5. Results of the forward stepwise linear regression analysis: items associated with clinical group CPQ₁₁₋₁₄ overall scores.

	Domain	β	t	P
<i>Dependent variable: CPQ₁₁₋₁₄ score in dental caries group^a</i>				
Difficulty chewing firm foods	FL	0.289	10.129	<0.001
Trouble sleeping	FL	0.121	3.251	<0.01
Slow eating	FL	0.191	6.576	<0.001
Difficulty opening mouth wide	FL	0.187	6.997	<0.001
Worried your are less healthy than others	EW	0.121	5.122	<0.001
Missed school	SW	0.104	4.489	<0.001
Teased/called names by other children	SW	0.114	2.900	<0.01
Shy/embarrassed	EW	0.214	6.371	<0.001
Food stuck to roof of mouth	OS	0.120	3.775	<0.01
Difficulty drinking/eating hor/cold foods	FL	0.133	5.034	<0.001
Upset	EW	0.148	4.856	<0.001
Bleeding gums	OS	0.121	3.909	<0.001
Avoid smiling when around other children	SW	-0.102	-2.774	<0.01
<i>Dependent variable: CPQ₁₁₋₁₄ score in malocclusion group^b</i>				
Pain in teeth/mouth	OS	0.562	28.632	<0.001
Difficulty drinking with straw	FL	0.137	6.653	<0.01
Avoid smiling when around other children	SW	0.344	26.366	<0.001
Unsure	EW	0.199	9.875	<0.001
Worried your are less healthy than others	EW	-0.189	-14.257	<0.001
Irritable/frustrated	EW	0.179	13.691	<0.001
Food caught between teeth	OS	0.102	8.812	<0.001
Missed school	SW	-0.115	-7.567	<0.001
Not wanted to talk to other children	SW	-0.046	-3.142	<0.05

Dependent variable: CPQ₁₁₋₁₄ score in TMD group^c

Unsure	EW	0.057	3.332	<0.01
Slow eating	FL	0.097	8.680	<0.001
Breathing through mouth	FL	0.090	9.126	<0.001
Upset	EW	0.101	5.231	<0.001
Unclear speech	FL	0.050	3.507	<0.01
Difficulty drinking/eating hot/cold foods	FL	0.035	2.688	<0.05
Left out by other children	SW	0.052	5.148	<0.001
Pain in teeth/mouth	OS	0.069	5.350	<0.001
Argued with other children or your family	SW	0.098	7.056	<0.001
Bleeding gums	OS	0.073	8.333	<0.001
Difficulty chewing firm foods	FL	0.058	5.144	<0.001
Worried you are less healthy than others	EW	0.046	3.247	<0.01
Food stuck to roof of mouth	OS	0.066	5.667	<0.001
Bad breath	OS	0.075	6.419	<0.001
Worried what other people think	EW	0.063	4.225	<0.001
Not wanted to speak/read aloud in class	SW	0.066	6.197	<0.001
Difficulty eating foods would like to eat	FL	0.094	6.466	<0.001
Shy/embarrassed	EW	0.102	5.379	<0.001
Not wanted/unable to take part in activities	SW	0.040	3.213	<0.01
Food caught between teeth	OS	0.037	3.365	<0.01
Had hard time paying attention in school	SW	0.047	2.611	<0.05
Anxious/fearful	EW	0.038	2.538	<0.05
Not wanted to talk to other children	SW	0.024	2.149	<0.05

CPQ, child perceptions questionnaire; TMD, temporomandibular disorder; OS, oral symptoms; FL, functional limitations, EW, emotional well-being; SW, social well-being

^a R²=0.989; F=176.43; P<0.001

^b R²=1.000; F=3217.11; P<0.001

^c R²=0.999; F=978.27; P<0.001

Items associated with global ratings of oral health and overall well-being scores

The OH model for both children and preadolescents in the dental caries and malocclusion groups contained two questions, one concerning the physical functional domains and one regarding the psychosocial domains (Tables 6 and 7). While two questions were significant in OH model for TMD group of children; one question pertained to oral symptoms ($\beta = -0.365$, $p < 0.05$), while the other concerned emotional well-being ($\beta = 0.483$, $P < 0.01$) (Table 6), just one question from the SW domain remained in the OH model ($\beta = 0.376$, $p < 0.01$) for TMD group of preadolescents (Table 7).

The OWB model for dental caries and malocclusion groups of children identified two significant questions, one concerning physical functionality and one pertaining to emotional well-being (Table 6). In preadolescents, the OWB model contained four questions for the dental caries group, one question was from the OS domain and three pertained to emotional well-being domain; and just one question from the FL for the malocclusion group ($\beta = 0.376$, $p < 0.01$) (Table 7). Four questions remained in the OWB model for TMD group; of these, three pertained to physical functionality and one to emotional well-being (Table 6). The OWB model for TMD group retained two questions; one question from the EW domain ($\beta = 0.394$, $p < 0.001$) and the other was from the SW domain ($\beta = 0.408$, $p < 0.001$) (Table 7).

All regression coefficients except three were negative: two questions from the OS and FL domain in the TMD group of children and one question from the SW domain in the dental caries group of preadolescents (Tables 6 and 7).

Table 6. Results from the forward stepwise linear regression analysis: CPQ₈₋₁₀ questions associated with global ratings of oral health and overall well-being scores in accordance with clinical group. Only the items that remained in the final models are shown.

	<i>Dependent variable: Global rating of oral health</i>				Significance of the model		
Clinical group	<i>CPQ₈₋₁₀ question:</i>	Domain	β	<i>P</i> -value	R ²	<i>F</i>	<i>P</i> -value
Dental caries	Frustrated	EW	0.445	0.000	0.401	18.76	<0.001
	Slow eating	FL	0.297	0.012			
Malocclusion	Shy	EW	0.435	0.022	0.353	5.72	<0.01
	Bad breath	FL	0.393	0.036			
TMD	Frustrated	EW	0.483	0.005	0.278	5.78	<0.01
	Difficulty drinking/eating hot/cold foods	OS	-0.365	0.030			
	<i>Dependent variable: Global rating of overall well-being</i>				Significance of the model		
Clinical group	<i>CPQ₈₋₁₀ question:</i>	Domain	β	<i>P</i> -value	R ²	<i>F</i>	<i>P</i> -value
Dental caries	Pain in teeth/mouth	OS	0.401	0.001	0.351	15.14	<0.001
	Upset	EW	0.311	0.010			
Malocclusion	Worried what other people think	EW	0.498	0.007	0.691	23.51	<0.001
	Trouble sleeping	FL	0.409	0.022			
TMD	Difficulty eating foods would like to eat	FL	0.352	0.016	0.590	10.06	<0.001
	Difficulty drinking/eating hot/cold foods	OS	0.265	0.045			
	Unclear speech	FL	-0.394	0.004			
	Frustrated	EW	0.301	0.046			

CPQ, child perceptions questionnaire; TMD, temporomandibular disorder; OS, oral symptoms; FL, functional limitations; EW, emotional well-being; SW, social well-being

Table 7. Results of the forward stepwise linear regression analysis: CPQ₁₁₋₁₄ questions associated with global ratings of oral health and overall well-being scores in accordance with clinical group. Only the items that remained in the final models are shown.

<i>Dependent variable: Global rating of oral health</i>					Significance of the model		
Clinical group	<i>CPQ₁₁₋₁₄ question:</i>	Domain	β	<i>P</i> -value	R ²	<i>F</i>	<i>P</i> -value
Dental caries	Worried your are different from other people	EW	0.320	0.023	0.228	6.35	<0.01
	Trouble sleeping	FL	0.301	0.033			
Malocclusion	Bad breath	OS	0.614	0.001	0.780	23.0	<0.001
	Worried your are less healthy than others	EW	0.492	0.003			
TMD	Argued with other children or your family	SW	0.376	0.004	0.142	8.91	<0.01
<i>Dependent variable: Global rating of overall well-being</i>					Significance of the model		
Clinical group	<i>CPQ₁₁₋₁₄ question:</i>	Domain	β	<i>P</i> -value	R ²	<i>F</i>	<i>P</i> -value
Dental caries	Worried your are less healthy than others	EW	0.475	0.000	0.418	7.36	<0.001
	Pain in teeth/mouth	OS	0.290	0.024			
	Avoid smiling when around other children	SW	-0.341	0.012			
	Worried your are different from other people	EW	0.275	0.038			
Malocclusion	Difficulty chewing firm foods	FL	0.915	0.000	0.838	72.28	<0.001
TMD	Not wanted/unable to take part in activities	SW	0.408	0.001	0.438	20.66	<0.001
	Shy/embarrassed	EW	0.394	0.001			

CPQ, child perceptions questionnaire; TMD, temporomandibular disorder; OS, oral symptoms; FL, functional limitations; EW, emotional well-being; SW, social well-being

DISCUSSION

This study used age-specific questionnaires to provide data concerning the OHRQoL of children and preadolescents with dental caries, malocclusions and signs and symptoms of TMD; this data was then used to compare the OHRQoL outcomes between clinical groups and between clinical and control groups. This preliminary study also examined the concepts that children in each clinical group used when completing the CPQ and responding to global questions concerning their perceptions of their oral health and its effect on their overall well-being.

Analysis of CPQ overall scores indicated that the OHRQoL of participants with signs and symptoms of TMD were statistically different from participants in the control groups for both children and preadolescents. Preadolescents with TMD also reported greater negative impacts for all CPQ₁₁₋₁₄ domains, except the functional domain, compared to the control group. Because preadolescents were more frequently affected by TMD signs and symptoms, a greater impact on QoL was expected for this age group, which is consistent with our previous study [10]. On the other hand, less severe pain and sensations may be responsible for the lesser impact on OHRQoL reported by children with TMD. In fact, patients with TMD initially display physical functional limitations, followed by psychological discomfort, social disability and handicap and finally chronic pain [27]. Hence, as the more painful and severe cases of TMD are more frequently observed in older children [6], this group also experiences a greater impact on psychosocial well-being [28].

Although the differences in the CPQ₈₋₁₀ total and domains scores between the different clinical groups were not statistically significant, they were in the expected direction, i.e., the CPQ₈₋₁₀ scores were aligned with the severity of the condition (dental caries < malocclusion < TMD). Gradients were also observed between the three preadolescent clinical groups, whereby those with TMD had the highest and those with dental caries had the lowest CPQ₁₁₋₁₄ total and domain scores. In general, these differences did not reach statistical significance. However, the CPQ₁₁₋₁₄ overall scores were significantly different between participants in the TMD and dental caries groups. However, the effect size suggested that the magnitude of the difference in the mean CPQ₁₁₋₁₄ scores for the TMD and dental caries groups was small (effect size = 0.25) [29]. Moreover, the

mean difference between these groups was only 8.2 on a scale that ranged from 0 to 148. In addition, significant differences between groups were noted for only the CPQ₁₁₋₁₄ overall score. When individual parameters were examined, the TMD group had higher scores for only 1 of the 37 items that comprised the questionnaire when compared to the dental caries group. Consequently, it is not unreasonable to suggest that participants in the TMD and dental caries groups had similar perceptions of their OHRQoL.

The existence of gradients in the CPQ scores between the clinical groups may not hold much significance when compared to participant responses to the two general health perception questions. No differences were observed between the clinical groups in participant scores, reflecting the limited extent to which oral conditions affected the health of their teeth and their overall lives. These results suggest that although participants in the TMD group may report higher impacts on QoL, their OH and OWB is no different compared to children and preadolescents with more common oral conditions such as dental decay and malocclusions. The lack of a marked difference is consistent with contemporary models of disease/disorder and its consequences, which suggest that health outcomes experienced by an individual are determined not only by the nature and severity of the disease/disorder, but also by personal and environmental characteristics [30, 31].

While children with malocclusions were reported more oral symptoms compared to children in the control group, preadolescents with severe and handicapping malocclusions were likely to have experienced more social impacts due to their cumulative disease experience compared to preadolescents with normal occlusion (DAI < 26). Previous studies found similar results in preadolescents [32, 33], suggesting that the most significant impact of malocclusion on the QoL in this age group is psychosocial. According to a study conducted by Foster Page *et al.* [34], only the most severe malocclusions might be expected to produce effects in the physical functionality domains. However, the CPQ results for children aged 8 to 10 years may reflect the fact that children's understanding of oral health and well-being is also affected by age-related experiences [35, 36]. During mixed dentition, which occurs in children aged 8–12 years, children experience many problems related to natural processes, such as exfoliating primary teeth, dental eruption, or spaces due to nonerupted permanent teeth that contribute to the higher prevalence of oral symptoms in

this age group. Moreover, the difference in the significance between the results of the two age groups may be explained by the particularity in the cognitive, emotional, functional, and behavioral characteristics of each age group [37]. This implies that the comparison between the results related to age-specific CPQ groups should be interpreted with caution, since they are heterogeneous in terms of developmental stage. In conclusion, our results suggest that malocclusion is as much a social phenomenon as an anatomical one.

Multiple linear regression analyses were used to identify the items associated with CPQ overall scores and the global ratings of OH and OWB. For the CPQ₈₋₁₀ overall scores, psychosocial domains were the main variables associated with the responses from all three clinical groups, suggesting that OHRQoL may be defined in a similar manner for children with these oral conditions. These results corroborate with the literature focusing the psychological and social development of children during the middle childhood (6–10 years of age). That is, between the ages of 6 to 10 years, children start to make evaluative judgments concerning their appearance, the quality of their friendships and other people's perceptions, emotions and behaviors [38, 39]. Psychosocial scores were also important in the CPQ₁₁₋₁₄ model for the malocclusion group, corroborating the findings of O'Brien *et al.* [33]. That is, the most significant impact of malocclusion on QoL is psychosocial, and is not related to oral or functional problems. However, the physical and psychosocial functional domains accounted equally for the variability in the responses of the TMD and dental caries group for CPQ₁₁₋₁₄ overall scores. These results reflect the view of health as a multidimensional concept during early adolescence. According to Rebok *et al.* [40], by the age of 11 or 12, a child's concept of health is organized around the following constructs: being functional, adhering to good lifestyle behaviors, a general sense of well-being and relationships with others.

The results generated by the two global ratings scores suggest that children and preadolescents view the health of their teeth and mouth and their OHRQoL as multidimensional concepts, corroborating a previous study in preadolescents [41]. Three CPQ₈₋₁₀ domains and all four CPQ₁₁₋₁₄ domains were found to account for the variability in the responses of children and preadolescents to global ratings, respectively. Further, analyses of items associated with global ratings in each clinical group suggest that the terms

health and well-being represent different thought constructs resulting terms of oral diseases. However, children with malocclusions and preadolescents with TMD integrated similar concepts for health and well-being into their responses for their global ratings of OH and OWB. While the functional and emotional domains scores were significant in the CPQ₈₋₁₀ model for OH, physical functional domain scores were associated with OWB scores for the dental caries group. Similarly, while oral symptoms and emotional domain scores were associated with OH scores, the functional limitations score was the only domain significant in the CPQ₁₁₋₁₄ model for the malocclusion group. In addition, more parameters were significant in the OWB model compared to OH for children and preadolescents with TMD and dental caries, respectively, suggesting that they experienced more impacts on their lives as an overall result of oral diseases.

Because the present results are preliminary data based on quantitative data, further research is needed to verify these findings and to explore variations in CPQ scores and global ratings of children and preadolescents according to their personal and social characteristics. Further, to better understand the content areas that are reflected in children's answers to the CPQ and questions concerning their global ratings of their oral health and its impact on their daily life and activities, qualitative research is required.

CONCLUSIONS

The questionnaires discriminated between children and preadolescents with different clinical conditions and controls. No differences in OHRQoL were observed between the clinical groups, as impacts are mediated by other factors including personal, social and environmental variables. The variables associated with CPQ scores varied according to clinical condition affecting children and preadolescents. The items associated with higher OHRQoL scores were mainly psychosocial for dental caries and TMD groups, physical functional and psychosocial for children and preadolescents with malocclusions, respectively. The results generated by the analysis of global ratings suggested that children and preadolescent view the health of their teeth and mouth and its impact on well-being as multidimensional concepts.

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REFERENCES

1. Barbosa TS, Gavião MB (2008) Oral health-related quality of life in children: part II. Effects of clinical oral health status. A systematic review. *Int J Dent Hyg* 6:100-107.
2. SB Brasil (2010) Pesquisa Nacional de Saúde bucal. <http://www.saude.gov.br>. Accessed 7 August 2011.
3. Cortellazzi KL, Pereira SM, Tagliaferro EP, Tengan C, Ambrosano GM, Meneghim Mde C, Pereira AC (2008) Risk indicators of dental caries in 5-year-old Brazilian children. *Community Dent Health* 25:253-256.
4. Pereira SM, Tagliaferro EP, Ambrosano GM, Cortelazzi KL, Meneghim M de C, Pereira AC (2007) Dental caries in 12-year-old schoolchildren and its relationship with socioeconomic and behavioural variables. *Oral Health Prev Dent* 5:299-306.
5. Dias PF, Gleiser R. Orthodontic treatment need in a group of 9-12-year-old Brazilian schoolchildren (2009) *Braz Oral Res* 23:182-189.
6. Barbosa T de S, Miyakoda LS, Pocztaruk R de L, Rocha CP, Gavião MB (2008) Temporomandibular disorders and bruxism in childhood and adolescence: review of the literature. *Int J Pediatr Otorhinolaryngol* 72:299-314.
7. Pereira LJ, Pereira-Cenci T, Del Bel Cury AA, Pereira SM, Pereira AC, Ambrosano GM, Gavião MB (2010) Risk indicators of temporomandibular disorder incidences in early adolescence. *Pediatr Dent* 32:324-328.
8. Jedel E, Carlsson J, Stener-Victorin E (2007) Health-related quality of life in child patients with temporomandibular disorder pain. *Eur J Pain* 11:557-563.
9. Barbosa TS, Leme MS, Castelo PM, Gavião MB (2011) Evaluating oral health-related quality of life measure for children and preadolescents with temporomandibular disorder. *Health Qual Life Outcomes* 9:32.

10. Jokovic A, Locker D, Stephens M, Kenny D, Tompson B, Guyatt G (2002) Validity and reliability of a questionnaire for measuring child oral-health-related quality of life. *J Dent Res* 81:459-463.
11. Jokovic A, Locker D, Tompson B, Guyatt G (2004) Questionnaire for measuring oral health-related quality of life in eight- to ten year- old children. *Pediatr Dent* 26:512-518.
12. Gherunpong S, Tsakos G, Sheiham A (2004) Developing and evaluating an oral health-related quality of life index for children; the CHILD-OIDP. *Community Dent Health* 21:161-169.
13. Broder HL, Wilson-Genderson M (2007) Reliability and convergent and discriminant validity of the Child Oral Health Impact Profile (COHIP Child's version). *Community Dent Oral Epidemiol* 35:20-31.
14. O'Brien K, Wright JL, Conboy F, Macfarlane T, Mandall N (2006) The child perception questionnaire is valid for malocclusions in the United Kingdom. *Am J Orthod Dentofacial Orthop* 129:536-540.
15. Brown A, Al-Khayal Z (2006) Validity and reliability of the Arabic translation of the child oral-health-related quality of life questionnaire (CPQ11-14) in Saudi Arabia. *Int J Paediatr Dent* 16:405-411.
16. McGrath C, Pang HN, Lo EC, King NM, Hägg U, Samman N (2008) Translation and evaluation of a Chinese version of the Child Oral Health-related Quality of Life measure. *Int J Paediatr Dent* 18:267-274.
17. Wogelius P, Gjørup H, Haubek D, Lopez R, Poulsen S (2009) Development of Danish version of child oral-health-related quality of life questionnaires (CPQ8-10 and CPQ11-14). *BMC Oral Health* 9:11.
18. Bekes K, John MT, Zyriax R, Schaller HG, Hirsch C (2011) The German version of the Child Perceptions Questionnaire (CPQ-G11-14): translation process, reliability, and validity in the general population. *Clin Oral Investig*. doi: 10.1007/s00784-010-0496-5
19. Barbosa TS, Tureli MCM, Gavião MBD (2009) Validity and reliability of the Child Perceptions Questionnaires applied in Brazilian children. *BMC Oral Health* 9:13.
20. Kirkwood BR, Stern J (2003) *Essentials of Medical Statistics*. London, Blackwell.

21. World Health Organization (1997) Oral health surveys. Basic methods. Geneva, World Health Organization.
22. Cons NC, Jenny J, Kohout FJ (1986) DAI: the Dental Aesthetic Index. Iowa City, IA, Iowa College of Dentistry, University of Iowa.
23. Estioko LJ, Wright FA, Morgan MV (1994) Orthodontic treatment need of secondary schoolchildren in Heidelberg, Victoria: an epidemiologic study using the Dental Aesthetic Index. *Community Dent Health* 11:147-151.
24. Dworkin SF, LeResche L (1992) Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. *J Craniomandib Disord* 6:301-355.
25. Riolo ML, Brandt D, TenHave TR (1987) Associations between occlusal characteristics and signs and symptoms of TMJ dysfunction in children and young adults. *Am J Orthod Dentofacial Orthop* 92:467-477.
26. Bonjardim LR, Gaviao MB, Carmagnani FG, Pereira LJ, Castelo PM (2003) Signs and symptoms of temporomandibular joint dysfunction in children with primary dentition. *J Clin Pediatr Dent* 28:53-58.
27. Segù M, Collesano V, Lobbia S, Rezzani C (2005) Cross-cultural validation of a short form of the Oral Health Impact Profile for temporomandibular disorder. *Community Dent Oral Epidemiol* 33:125-130.
28. Dahlström L, Carlsson GE (2010) Temporomandibular disorders and oral health-related quality of life. A systematic review. *Acta Odontol Scand* 68:80-85.
29. Cohen J (1988) *Statistical Power Analysis for the Behavioural Sciences*. Hillside, NJ, Lawrence Erlbaum Associates.
30. Locker D (1988) Measuring oral health: a conceptual framework. *Community Dent Health* 5:3-18.
31. Wilson IB, Cleary PD (1995) Linking clinical variables with health-related quality of life. A conceptual model of patient outcomes. *JAMA* 273:59-65.
32. O'Brien K, Wright JL, Conboy F, Macfarlane T, Mandall N (2006) The child perception questionnaire is valid for malocclusions in the United Kingdom. *Am J Orthod Dentofacial Orthop* 20129:536-540.

33. O'Brien C, Benson PE, Marshman Z (2007) Evaluation of a quality of life measure for children with malocclusion. *J Orthod.* 34:185-193.
34. Foster Page LA, Thomson WM, Jokovic A, Locker D (2005) Validation of the Child Perceptions Questionnaire (CPQ 11-14). *J Dent Res* 84:649-652.
35. Gherunpong S, Tsakos G, Sheiham A (2004) The prevalence and severity of oral impacts on daily performances in Thai primary school children. *Health Qual Life Outcomes* 12:57.
36. Tubert-Jeannin S, Pegon-Machat E, Gremeau-Richard C, Lecuyer MM, Tsakos G (2005) Validation of a French version of the Child-OIDP index. *Eur J Oral Sci* 113:355-362.
37. de Oliveira CM, Sheiham A (2003) The relationship between normative orthodontic treatment need and oral health-related quality of life. *Community Dent Oral Epidemiol* 31:426-436.
38. Bee H (1998) *Lifespan Development*. New York, NY Addison Wesley Longman.
39. Hetherington EM, Parke RD, Locke VO (1999) *Child Psychology: A Contemporary Viewpoint*. New York, The McGraw-Hill Companies.
40. Rebok G, Riley A, Forrest C, Starfield B, Green B, Robertson J, Tambor E (2001) Elementary school-aged children's reports of their health: a cognitive interviewing study. *Qual Life Res* 10:59-70.
41. Jokovic A, Locker D, Guyatt G (2005) What do children's global ratings of oral health and well-being measure? *Community Dent Oral Epidemiol* 33:205-211.

CAPÍTULO 3

Factors associated with oral health-related quality of life in children and preadolescents

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TAÍS DE SOUZA BARBOSA¹, MARINA SEVERI LEME¹, PAULA MIDORI CASTELO², MARIA BEATRIZ DUARTE GAVIÃO¹

¹ Department of Pediatric Dentistry, Piracicaba Dental School, University of Campinas, Piracicaba/SP, Brazil

² Department of Biological Sciences, Federal University of São Paulo, Diadema/SP, Brazil

E-mails:

tais_sb@yahoo.com

ma_leme@terra.com.br

pcastelo@ferrua@hotmail.com

mbgaviao@fop.unicamp.br

Correspond with:

Prof. Maria Beatriz Duarte Gavião

Faculdade de Odontologia de Piracicaba/UNICAMP – Departamento de Odontologia Infantil – Área de Odontopediatria

Adress: Av. Limeira 901, Piracicaba/SP, Brasil / Zip code: 13414-903

Phone: 55 19 2106 5368/5287 – Fax: #55-19-21065218

E-mail: mbgaviao@fop.unicamp.br

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ABSTRACT

Purpose: To evaluate the factors associated with the perceptions of oral health-related quality of life (OHRQoL) in children and preadolescents. **Methods:** 167 students aged 8-14 years were recruited from the public schools of Piracicaba, Brazil. Participants were examined for dental caries, gingivitis, fluorosis, malocclusions and signs and symptoms of temporomandibular disorders (TMD). OHRQoL was measured using the Brazilian Portuguese versions of the Child Perceptions Questionnaire (CPQ 8-10 and 11-14). Symptoms of anxiety and depression were evaluated using self-applied questionnaires. Sociodemographic characteristics, dental history and oral hygiene habits was evaluated using a questionnaire. Bivariate and multivariate analyses were used to identify the variables associated with CPQ scores. **Results:** CPQ₈₋₁₀ scores were associated with a higher frequency of tooth brushing, fluorosis, TMD and symptoms of anxiety and depression. CPQ₁₁₋₁₄ scores were associated with females, TMD and symptoms of anxiety and depression. The presence of TMD (OR=5.53, $p<0.01$) and anxiety symptoms (OR=3.30, $p<0.05$) were associated with CPQ₈₋₁₀ scores. CPQ₁₁₋₁₄ scores were associated with TMD (OR=3.96, $p<0.01$) and depressive symptoms (OR = 3.50, $p<0.05$). **Conclusions:** Oral and emotional statuses of children and preadolescents were shown to influence their perceptions of OHRQoL. Therefore, these factors should be considered in assessments that involve this age group.

Key words: Child, Oral health, Preadolescent, Quality of life

BACKGROUND

Oral health-related quality of life (OHRQoL) is a multidimensional measure that indicates the extent to which an individual's daily living is affected by oral diseases (1) and is a facet of a patient's health-related quality of life (HRQoL). Recently, OHRQoL has become an important aspect of evaluating the impact of a variety of oral conditions on the quality of life (QoL) and well-being of children (2, 3, 4). To evaluate a child's perceptions of the impact of oral conditions on physical and psychosocial functioning, measures that account for the cognitive abilities of a child and the child's life style was developed for

children that are 8 to 10 years old (Child Perceptions Questionnaires - CPQ₈₋₁₀) (5) and for preadolescents that are 11 to 14 years old (CPQ₁₁₋₁₄) (6).

These measures are based on a theoretical framework proposed by the World Health Organization's International Classification of Impairments, Disabilities and Handicaps (7) and a multidimensional model of oral health (8). Based on this framework, five consequences of oral disease are present and sequentially related: impairment, functional limitation, pain and discomfort, disabilities and handicaps. Other models, such as the model proposed by Wilson and Cleary (9), also identify individual characteristics that influence links between biological variables, patient function and QoL. For Wilson and Cleary (9), the health and HRQoL outcomes experienced by an individual are not solely determined by the nature and severity of the disease/disorder but also by the characteristics of the individual and the physical and social environment.

Consistent with contemporary models of disease and its consequences, Locker (10) found socioeconomic disparities in OHRQoL outcomes of Canadian adolescents after controlling for the presence and severity of a number of oral diseases, such as dental caries, dental injury and malocclusion. He also found that the relationship between socioeconomic status and health outcomes may be due to differences in psychological assets and psychosocial resources (10). Humphris *et al.* (11) and Agou *et al.* (12) found preliminary evidence of a link between psychological assets and the OHRQoL of children and preadolescents, respectively. They also found significant associations between CPQ scores and a measure of self-esteem. However, the link between psychological factors and self-perceived oral health remains inconclusive. Therefore, further research is needed. This research must include additional psychosocial variables that are frequently observed in children and adolescents from low income households, such as anxiety and depression (13) and oral disorders that are intimately associated with psychological status, such as temporomandibular disorders (TMD) (14). The simultaneous inclusion of a spectrum of factors that may influence HRQoL may provide an opportunity to better understand children and preadolescents and their OHRQoL rating.

Thus, the objective of the current study was to evaluate the influence of clinical, psychological, sociodemographical and dental care characteristics on the self-perceptions of oral health and its impact on QoL in children and preadolescents.

MATERIAL AND METHODS

Participants

The sample size was calculated based on caries experience reported in previous studies carried out in Piracicaba-SP, Brazil (15). Considering a mean of 1.32 DMFT, standard deviation (SD) of 1.92, admitting a sampling error of 20%, and a confidence level of 90%, the sample size was defined in 142 individuals. A total of 167 students of public schools (62 boys and 108 girls), aged 8 to 14 years, with no systemic diseases or communication and/or neuromuscular problems, participated in the study. All students obtained parental consent.

The exclusion criteria were children with facial traumatism, neurological or psychiatric disorders, use of dental prostheses, current use of medications (e.g., antidepressive, muscle relaxant, narcotic or non-steroidal anti-inflammatory), previous or present orthodontic treatment and other orofacial pain conditions, which could interfere with TMD diagnoses. Participants whose parents/caregivers did not answered the prestructured questionnaire evaluating sociodemographic characteristics, child oral hygiene habits and dental history were also excluded.

This study was approved by the Research Ethics Committee of the Dental School of Piracicaba, State University of Campinas (protocol nº 021/2006).

Measures

Sociodemographic characteristics, oral hygiene habits and dental history

Data were collected using a prestructured questionnaire given to the parents/caregivers. This questionnaire evaluated sociodemographic characteristics (the child's age and gender, the number of adults in the household and the mother's educational

level), dental service utilization (past and current actual experience) and the child's oral hygiene habits (tooth brushing frequency).

Dental caries, malocclusion, fluorosis and gingivitis

The students were clinically examined for dental caries, gingivitis, fluorosis and malocclusion by two examiners who were calibrated according to the WHO Oral Health Surveys: Basic Methods criteria (16). All examinations took place during the day at the school but were not conducted in direct sunlight.

The presence of caries in each participant was assessed using dmft (the sum of the decayed, missing and filled teeth in the primary dentition) and DMFT (the sum of the decayed, missing and filled teeth in the permanent dentition) indices. The periodontal status assessment criteria were those proposed in the WHO's 1997 oral health survey methods manual (16) and employed in the Community Periodontal Index (CPI). This index classifies the periodontal status based on six index teeth (16, 11, 26, 36, 31 and 46) in patients under the age of 20 years. The codes are the following: 0 = healthy and 1 = bleeding observed directly or with a mouth mirror after probing. The presence or absence and the severity of dental fluorosis were evaluated using Dean's index criteria (DI) (17) with the following levels: 0 = normal; 1 = questionable; 2 = very mild; 3 = mild; 4 = moderate; and 5 = severe. The recording was based on the two teeth that were most affected. Malocclusion was scored using the Dental Aesthetic Index (DAI) (18), which assesses the relative social acceptability of the dental appearance by collecting and weighing data from 10 intraoral measurements. This enables each individual to be placed on a dental appearance continuum that ranges from 13 (the most socially acceptable) to 100 (the least acceptable) and orthodontic treatment needs can be prioritized based on the predefined categories of 'minor/none' (scores 13 to 25), 'definite' (26 to 31), 'severe' (32 to 35), or 'handicapping' (36 or more) (19).

The dental examiners underwent a calibration session on the same day and resulted in interexaminer kappa scores of 0.96 for DMFT/dmft, 0.80 for fluorosis, 0.73 for gingivitis and 0.88 for DAI scores. After a period of 2 weeks, the intraexaminer reliability was verified by conducting replicate examinations in 20 individuals and resulted in a kappa

score of 0.95 for DMFT/dmft, 0.81 for gingivitis, 0.80 for fluorosis and 0.97 for malocclusion.

Signs and symptoms of temporomandibular disorders

Clinical signs of temporomandibular disorders were assessed by one calibrated examiner using the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) criteria (20), which included the following: pain on palpation, mandibular range of motion (mm), associated pain (jaw opening pattern, unassisted opening, maximum-assisted opening and mandibular excursive and protrusive movements), sounds from the temporomandibular joint and tenderness induced by muscle and joint palpation.

A self-reported questionnaire was used to assess the subjective symptoms of TMD according to Riolo *et al.* (21). This questionnaire assessed the pain in the jaws when functioning (e.g., chewing), unusually frequent headaches (more than once a week with an unknown etiology), stiffness/tiredness in the jaws, difficulty in opening the mouth wide, grinding of the teeth and sounds from the TMJ. Each question could be answered with a “yes” or “no”. Individuals with at least one sign and one symptom were classified as TMD patients (22).

Prior to the clinical examination, the dental examiner (TSB) participated in the calibration process, which was completed according to RDC/TMD (20) and was divided into theoretical discussions on codes and criteria for the study and practical activities. Intra-examiner reliability was investigated by conducting replicate examinations on 20 individuals one week later and resulted in a strong reliability agreement.

Oral health-related quality of life

Data were collected using the Portuguese versions of the Child Perceptions Questionnaire for individuals aged 8-10 years (CPQ₈₋₁₀) and 11-14 years (CPQ₁₁₋₁₄) (23). These formed the components of the Child Oral Health Quality of Life (COHQoL) that had been designed to assess the impact of oral conditions on the QoL of children and adolescents (5, 6). They are both self-completed. Items of the CPQ used Likert-type scales with the following response options: “Never” = 0; “Once or twice” = 1; “Sometimes” = 2;

“Often” = 3; and “Everyday or almost everyday” = 4. For the CPQ₁₁₋₁₄, the recall period was 3 months, while for the CPQ₈₋₁₀, it was 4 weeks. Items were grouped into four domains: oral symptoms, functional limitations, emotional well-being and social well-being. A high score indicated a higher negative impact on QoL.

Psychological well-being

Data for the anxiety symptoms were collected using the Portuguese version of the Revised Children’s Manifest Anxiety Scale (RCMAS) (24) for individuals that were 6-19 years old (25). The RCMAS is a 28-item yes/no self-rating scale, which consists of items designed to assess physiological symptoms, social concerns and worry. The items were scored 1 or 0, which yielded a range from 0 to 28. Higher scores indicated increased anxiety.

Symptoms of depression were assessed using the Portuguese version of the Children’s Depression Inventory (CDI) (26), which was originally developed by Kovacs (27). The CDI consists of 27 items designed to assess a variety of symptoms associated with depression, such as sleep disturbances, appetite loss, suicidal thoughts and general dysphoria. Each item consisted of three brief statements that described options that ranged from normal responses to responses that indicated moderate or severe symptoms of depression. The items were scored 0 (normal), 1 (moderate), or 2 (severe) and yielded a range from 0 to 54.

Data analysis

Statistical analysis was performed using SPSS 9.0 (SPSS, Chicago, IL, USA) with a 5% significance level and normality was assessed using the Kolmogorov-Smirnov test. Because the score distributions were asymmetrical, non-parametrical tests were used in the analyses performed.

CPQ₈₋₁₀ and CPQ₁₁₋₁₄ overall scores for each participant were calculated by summing the response codes for the 25 and 37 items that comprised the measures, respectively. Simple descriptive statistics were generated and bivariate analyses were used to assess the associations between CPQ scores, the clinical measures of oral

diseases/disorders, the psychological scores and the sociodemographic characteristics of the child, the child's oral health habits and the use of dental services derived from the parental questionnaire. Chi-squared and Mann-Whitney tests were used to assess the significance of these associations.

Multiple logistic regression analyses were used to assess the independent effects of the variables on the CPQ scores as dependent variables. Median values of the CPQ scores were used as thresholds for the outcomes. Only variables with $P \leq 0.25$ for the bivariate analysis were kept in the multivariable models as potential confounders (28).

RESULTS

Characteristics of participants

Table 1 shows the prevalence and mean scores (standard deviation; SD) of the participants from each age group (children and preadolescents) in terms of sociodemographic characteristics, oral health habits, dental history and clinical and psychological characteristics.

Descriptive statistics

Scores from the CPQ₈₋₁₀ overall scale ranged from 0 to 65 with a mean score of 14.0 and a standard deviation of 14.3 (Table 2). This revealed that the QoL of the child participants had substantial variability in its measure. The floor effects were minimal with only 8.5% of subjects having a score of zero. No ceiling effects were apparent because no subjects had a maximum score. The CPQ₁₁₋₁₄ also showed substantial variability with scores ranging from 1 to 72, a mean of 21.2 and a standard deviation of 15.5. No preadolescents had either floor effects or ceiling effects.

Table 2 also shows the distribution of responses to the CPQ₈₋₁₀ and CPQ₁₁₋₁₄ overall scales by 94 children and 73 preadolescents, respectively. Overall, 8.1% of the children reported an 'often' or 'everyday' impact on their QoL in the prior four weeks. The proportion of preadolescents who responded 'often' or 'everyday' during the previous 3 months was 5.7%.

Bivariate analysis (Chi-squared test)

Characteristics of the evaluated sample in relation to CPQ scores are shown in Tables 3 and 4. Children whose CPQ₈₋₁₀ scores were above the median were more likely to brush their teeth 3 or more times/day, to have dental fluorosis, to have signs and symptoms of TMD and to report anxiety and symptoms of depression. Preadolescents whose CPQ₁₁₋₁₄ scores were above the median were more likely to be female, to have signs and symptoms of TMD and to report anxiety and symptoms of depression.

Multiple logistic regression analysis

The results of the multiple logistic regression analysis are shown in Tables 5 and 6. Nine variables were entered into the CPQ₈₋₁₀ model. These variables were the following: age, gender, the frequency of daily tooth brushing, the current dental treatment, the dental caries experience, fluorosis, the signs and symptoms of TMD and the symptoms of anxiety and depression (model chi-squared = 33.92; $P < 0.0001$). A poor OHRQoL score was independently associated with the presence of signs and symptoms of TMD (OR = 5.53) and anxiety symptoms (OR = 3.30) in children (Table 5).

Four variables were entered into the CPQ₁₁₋₁₄ model. These variables were the following: gender, the signs and symptoms of TMD and the symptoms of anxiety and depression. The chi-squared model was significant ($P < 0.0001$) and the associated chi-squared coefficient was 23.46. CPQ₁₁₋₁₄ scores that were above the median were independently associated with having signs and symptoms of TMD (OR = 3.96) and symptoms of depression (OR = 3.50) (Table 6).

Table 1. Summary data on sample characteristics.

Characteristics		Children	Preadolescents
Number (%)		94 (56.3)	73 (43.7)
Mean age \pm SD		9.0 \pm 0.8	11.9 \pm 1.1
Gender (%)	Male	38 (40.4)	21 (28.8)
	Female	56 (59.6)	52 (71.2)
Mother's education (%)	Elementary / Middle school	26 (27.7)	30 (41.1)
	High school	50 (53.2)	35 (47.9)
	Undegraduate study	18 (19.1)	8 (11.0)
Number of adults in household (%)	One	19 (20.2)	15 (20.5)
	Two or more	75 (79.8)	58 (79.5)
Frequency of daily toothbrushing (%)	\leq Twice a day	43 (45.7)	32 (43.8)
	$>$ Twice a day	51 (54.3)	41 (56.2)
Dental visit in the last year (%)	No	44 (46.8)	33 (45.2)
	Yes	50 (53.2)	40 (54.8)
Actual dental treatment (%)	No	71 (75.5)	58 (79.5)
	Yes	23 (24.5)	15 (20.5)
Reasons for no dental treatment (%)	No need	28 (39.4)	26 (44.8)
	Lack of opportunity	37 (52.1)	29 (50.0)
	Lack of time	6 (8.5)	3 (5.2)
Dental caries experience (%)	DMFT/dmft = 0	47 (50.0)	41 (56.2)
	DMFT/dmft \geq 1	47 (50.0)	32 (43.8)
Malocclusion categories (%)	Minor/none	42 (44.7)	50 (68.5)
	Definitive	19 (20.2)	10 (13.7)
	Severe	12 (12.8)	8 (11.0)
	Handicapping	21 (22.3)	5 (6.8)
Fluorosis (%)	None	76 (80.9)	51 (69.9)
	Very mild / Mild	18 (19.1)	22 (30.1)
Gingivitis (%)	No bleeding	69 (73.4)	63 (86.3)
	Bleeding	25 (26.6)	10 (13.7)
Signs and symptoms of TMD (%)	No	44 (46.8)	22 (30.1)
	Yes	50 (53.2)	51 (69.9)
Mean RCMAS score \pm SD		14.8 \pm 6.7	16.4 \pm 6.2
Mean CDI score \pm SD		7.7 \pm 4.7	11.2 \pm 7.1

DMFT,/dmft, Decayed, missing, and filled teeth; DAI, Dental Aesthetic Index; TMD, Temporomandibular disorders; R-CMAS, Revised-Children's Manifest Anxiety Scale; CDI, Children's Depression Inventory.

Table 2. Descriptive statistics: CPQ overall scores and sample distribution for floor and ceiling effects and responses options.

	CPQ ₈₋₁₀ (n=94)	CPQ ₁₁₋₁₄ (n=73)
Number of items	25	37
Range of possible scores	0-100	0-148
Range	0-65	1-72
Floor effect*	8.5	0.0
Ceiling effect†	0.0	0.0
Mean ± SD	14.0 ± 14.3	21.2 ± 15.5
<i>Frequency of responses (%)</i>		
Never	71.4	66.0
Once or twice	11.8	18.9
Sometimes	8.7	9.5
Often	5.8	4.4
Everyday or almost everyday	2.3	1.3

CPQ, Child Perceptions Questionnaire

* Percentage of children with 0 score

† Percentage of children with maximum scores

Table 3. Bivariate analysis: associations between sociodemographic, oral health habits and dental care with CPQ overall scores.

Variables	Category		CPQ ₈₋₁₀ overall scores			CPQ ₁₁₋₁₄ overall scores		
			≤ median	> median	<i>P</i> [*]	≤ median	> median	<i>P</i> [*]
<i>Sociodemographic</i>								
Age	8-9	11-12	61.5	76.2	0.130	60.4	63.4	0.764
	10	13-14	38.5	23.8		39.6	36.6	
Gender	Male		48.1	31.0	0.093	35.8	17.1	0.044
	Female		51.9	69.0		64.2	82.9	
Mother's education	≤ 8 years		26.9	28.6	0.859	35.8	43.9	0.428
	> 8 years		73.1	71.4		64.2	56.1	
Number of adults in household	One		17.3	23.8	0.435	18.9	17.1	0.823
	Two or more		82.7	76.2		81.1	82.9	
<i>Oral health habits and dental care</i>								
Frequency of daily toothbrushing	≤ Twice a day		55.8	33.3	0.030	43.4	48.8	0.603
	> Twice a day		44.2	66.7		56.6	51.2	
Dental visit in the last year	No		44.2	50.0	0.577	45.3	48.8	0.736
	Yes		55.8	50.0		54.7	51.2	
Actual dental treatment	No		82.7	66.7	0.072	81.1	78.0	0.712
	Yes		17.3	33.3		18.9	22.0	

CPQ, Child Perceptions Questionnaire

* Chi-square test

Table 4. Bivariate analysis: associations between clinical and psychological variables and CPQ overall scores.

Variables	Category	CPQ ₈₋₁₀ overall scores			CPQ ₁₁₋₁₄ overall scores		
		≤ median	> median	<i>P</i> [*]	≤ median	> median	<i>P</i> [*]
<i>Clinical</i>							
DMFT/dmft	= 0	44.2	57.1	0.213	58.5	53.7	0.639
	≥ 1	55.8	42.9		41.5	46.3	
DAI categories	Acceptable occlusion (DAI≤34)	76.9	71.4	0.544	92.5	85.4	0.269
	Less acceptable occlusion (DAI=35+)	23.1	28.6		7.5	14.6	
Fluorosis	No	88.5	71.4	0.037	73.6	68.3	0.574
	Yes	11.5	28.6		26.4	31.7	
Gingivitis	No bleeding	69.2	78.6	0.308	83.0	90.2	0.314
	Bleeding	30.8	21.4		17.0	9.8	
Signs and symptoms of TMD	No	59.6	31.0	0.006	43.4	17.1	0.007
	Yes	40.4	69.0		56.6	82.9	
<i>Psychological</i>							
Anxiety symptoms	RCMAS ≤ median	71.2	35.7	0.001	60.4	31.7	0.006
	RCMAS > median	28.8	64.3		39.6	68.3	
Depressive symptoms	CDI ≤ median	63.5	40.5	0.026	69.8	36.6	0.001
	CDI > median	36.5	59.5		30.2	63.4	

CPQ, Child Perceptions Questionnaire; DMFT/dmft, Decayed, missing, and filled teeth; DAI, Dental Aesthetic Index; TMD, Temporomandibular disorders; R-CMAS, Revised-Children's Manifest Anxiety Scale; CDI, Children's Depression Inventory.

* Chi-square test

Table 5. Multiple logistic regression: OR and 95% CI of the variables independently associated with CPQ₈₋₁₀ overall scores (> median).

Dependent variable:	CPQ ₈₋₁₀ overall scores*			
Independent variables:	Category	OR	95% CI	P
Age	8-9	0.39	0.12-1.29	0.156
Gender	Female	1.22	0.42-3.64	0.721
Frequency of daily toothbrushing	> Twice a day	1.82	0.63-5.30	0.206
Actual dental treatment	Yes	1.81	0.55-5.99	0.392
Dental caries experience	DMFT/dmft \geq 1	0.46	0.17-1.28	0.130
Fluorosis	Yes	1.53	0.42-5.54	0.352
Signs and symptoms of TMD	Yes	5.53	1.72-17.73	0.004
Anxiety symptoms	RCMAS > median	3.30	1.09-9.99	0.034
Depressive symptoms	CDI > median	2.73	0.88-8.52	0.082

CPQ, Child Perceptions Questionnaire; DMFT/dmft, Decayed, missing, and filled teeth; Temporomandibular disorders; R-CMAS, Revised-Children's Manifest Anxiety Scale; CDI, Children's Depression Inventory; OR, Odds Ratio; CI, Confidence Interval

* Model chi-square = 33.92; P< 0.0001

Table 6. Multiple logistic regression: OR and 95% CI of the variables independently associated with CPQ₁₁₋₁₄ overall scores (> median).

Dependent variable:	CPQ ₁₁₋₁₄ overall scores*			
Independent variables:	Category	OR	95% CI	P
Gender	Female	2.70	0.91-8.08	0.075
Signs and symptoms of TMD	Yes	3.96	1.35-11.64	0.012
Anxiety symptoms	RCMAS > median	1.77	0.64-4.88	0.268
Depressive symptoms	CDI > median	3.50	1.26-9.71	0.016

CPQ, Child Perceptions Questionnaire; R-CMAS, Revised-Children's Manifest Anxiety Scale; CDI, Children's Depression Inventory.

OR, Odds Ratio; CI, Confidence Interval

* Model chi-square = 23.46; P< 0.0001

Bivariate analysis (Mann-Whitney test)

Given the independent effects of the clinical and psychological variables, further analyses of the differences in the mean CPQ scores between TMD groups in children and

preadolescents with strong (RCMAS and CDI equal or below the median, respectively) and poor emotional well-being (RCMAS and CDI above the median, respectively) were completed. Figure 1 showed that in a group of children with RCMAS equal or below the median no differences in CPQ₈₋₁₀ scores were observed for those that had and did not have signs and symptoms of TMD. However, the differences were significant among the children with RCMAS above the median. The analyses in Figure 2 also showed that the presence of signs and symptoms of TMD did not have an impact on the OHRQoL of children with a poor psychological well-being (CDI > median). Conversely, the scores of preadolescents with a CDI that was equal or above the median were significantly different between TMD groups.

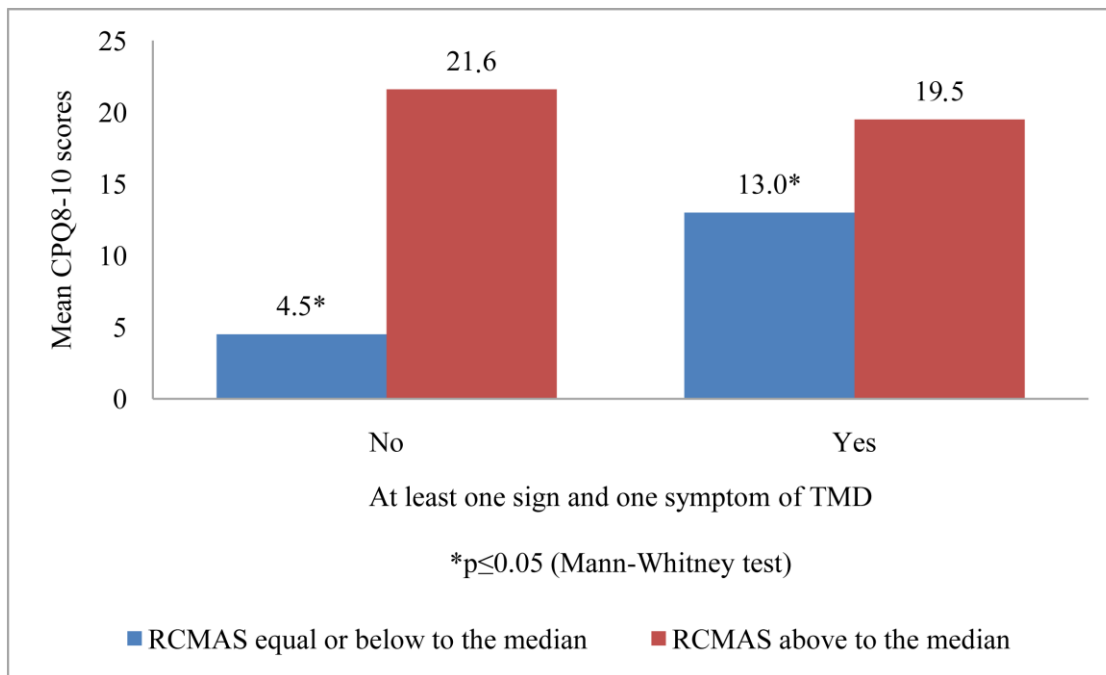


Figure 1. Mean CPQ₈₋₁₀ scores for those with and without signs and symptoms of TMD by anxiety category.

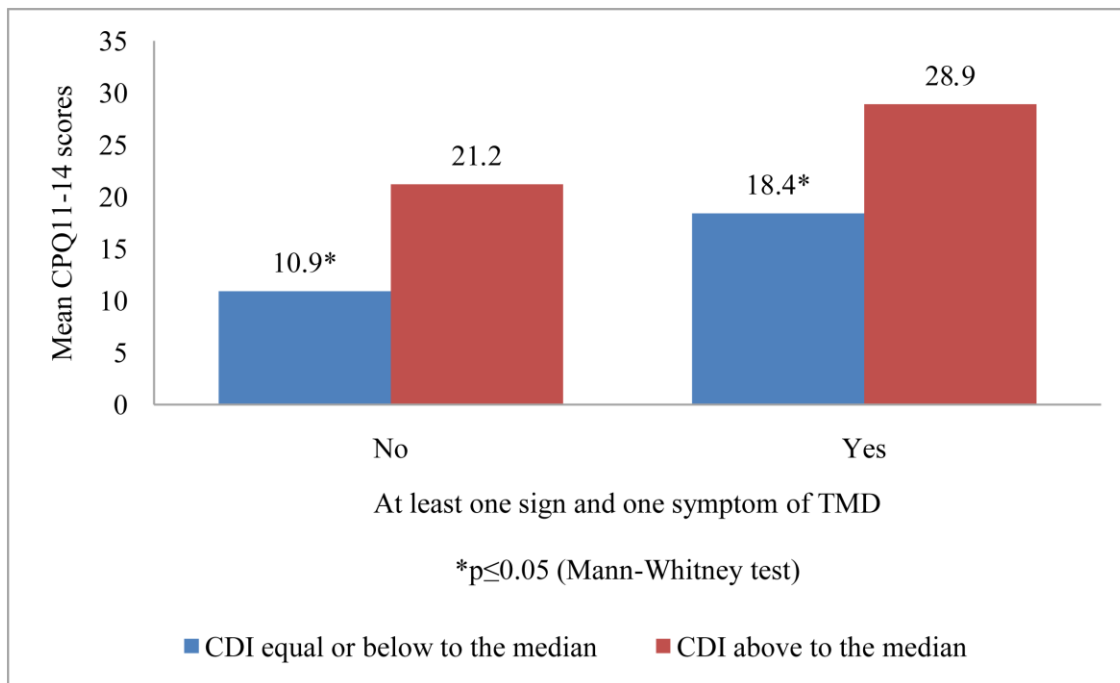


Figure 2. Mean CPQ₁₁₋₁₄ scores for those with and without signs and symptoms of TMD by depression category.

DISCUSSION

This study was designed as a preliminary evaluation of the referents that children and preadolescents use when responding to CPQ questions concerning their perceptions of oral health and its effects on QoL. It was performed by examining the associations between the clinical measures of oral diseases/disorders, psychological status, sociodemographic characteristics, oral health habits, dental care and data collected using the CPQ₈₋₁₀ for children and the CPQ₁₁₋₁₄ for preadolescents.

Bivariate analyses were used to examine the associations between the CPQ overall scores and the variables and multiple logistic regression analysis was used to identify the independent variables associated with CPQ overall scores. The results generated by these analyses provided preliminary evidence that suggests that children and preadolescents view their OHRQoL as multidimensional concepts, which is in agreement with the result observed by Rebok *et al.* (29). Furthermore, the difference in the number of variables remaining in the CPQ₈₋₁₀ and CPQ₁₁₋₁₄ models might suggest that OHRQoL represent

different constructs for children and preadolescents. This difference may be explained by the differences in the cognitive, emotional, functional and behavioral characteristics of each age group (30). However, the two constructs were not entirely distinct because the associated variables were similar; all of the four variables remaining in the model for CPQ₁₁₋₁₄ also contributed to the model for CPQ₈₋₁₀.

The influence of gender on preadolescents' perceptions of oral health is consistent with the results of other studies showing greater impacts on the QoL of females, especially with respect to emotional well-being (2, 31, 32) and peer interactions (32). Furthermore, Bianco *et al.* (33) found evidence of female adolescents experiencing one or more of their daily activities impacted by their dentistry. For these authors, the difference could have been explained by the fact that females are more sensitive to the perception of their own appearance than males. Similarly, the female gender was one of the independent risk factors for the aesthetic impact of malocclusion on the daily life of Brazilian school children who were 10-14 years old (34). In the present study, the assumption of the gender-related OHRQoL status was observed only for the preadolescent group; this result is consistent with some psychological theories that suggest that HRQoL decreases by gender specifically with increasing age, which was also observed by Michel *et al.* (35). These authors found that female adolescents had a worse subjective health and HRQoL than male adolescents. This difference could be explained by menarche and an imbalance of the hormonal status (36), the prevalence of stressful life events (37) and specific coping mechanisms (38), which may all lead to a poor psychological well-being (39-41). Previous studies have also shown evidence that girls differ from boys in their social relationships and how they are influenced (42-44). This is in agreement with the findings of Bos *et al.* (32), which found that girls reported more problems with peer interaction, suggesting that they were more likely to avoid social interaction with other children due to their oral status than boys.

Surprisingly, 8- to 10-year-old children who brushed their teeth more than two times/day had an increased chance of having a worse QoL than those who brushed their teeth less often. These findings contradict previous evidence that showed that a lower frequency of tooth brushing yielded a less favorable oral QoL, which was observed by

Bianco *et al.* (33). Other authors who addressed the social dimensions of oral health by relating oral QoL to oral health status found significant positive associations between a child's OHRQoL and a higher frequency of tooth brushing and flossing (45). Because the findings of the present study and the above-mentioned studies were obtained from populations from different cultures and using distinct OHRQoL measures, the contradictory outcomes may be explained by the influence of cultural norms and the expectations on children's perception of their oral health and its effect on their QoL. This is because causal pathways between clinical variables may include individual and environment variables as both moderators and mediators (9). Thus, in the studied population, a child who presents a higher rate of preventive dental behavior, such as tooth brushing, may have higher expectations towards their oral health, which may be reflected in their self-perceived QoL ratings.

Furthermore, 8- to 10-year-old children whose CPQ₈₋₁₀ scores were above the median were more likely to have dental fluorosis. This finding is in agreement with previous evidence that showed that children's confidence and self-esteem can be impaired by the appearance of their teeth, which reflects their perceptions of the shape and color of teeth (46). Although the percentage of children with mild fluorosis was relatively low (19.1%), a discrete change in the color of teeth seemed to be enough to contribute to a negative self-perception of QoL among children. Similarly, Robinson *et al.* (4) found greater impacts on self-perception in Ugandan children where fluorosis was not frequent or severe. The present results also confirm the results of a previous study on Canadian children that indicated that oral health problems have a severe impact on children from low income environments (10).

The presence of the signs and symptoms of TMD was independently associated with a poor QoL in both age groups, even after controlling for confounding factors. These results may be explained by the fact that TMD is known to be frequently associated with pain, which may affect physical functioning, emotional status and behavior and result in limitations of physical activities, school work and activities with friends. Consequently, these limitations will be reflected in a patient's self-rated QoL, which was observed by Jedel *et al.* (47). Although the prevalence of signs and symptoms of TMD in the CPQ₈₋₁₀

group (53.2%) was lower than the CPQ₁₁₋₁₄ group (69.9%), children had an increased chance of reporting a worse OHRQoL (OR=5.53) compared to preadolescents (OR=3.30). This difference may be explained by the fact that children's understanding of oral health and well-being is also affected by age-related experiences (e.g., exfoliating primary teeth, dental eruption, or space due to a non-erupted permanent tooth) (48, 49), which might make younger children more sensitive to oral symptoms than older age groups (3). Overall, the present findings are consistent with theoretical models of disease and its outcomes, such as the results proposed by Locker (8), which revealed relationships between the adverse effects that may result from a person's oral condition.

Psychological variables also remained in both of the CPQ regression models and they were considered to be referents associated with OHRQoL scores of children and preadolescents. Humphris *et al.* (11) and Agou *et al.* (12) have published preliminary evidence for a link between emotional status and self-perceived oral health outcomes. These two studies found significant associations between low self esteem and negative OHRQoL impacts in children. Agou *et al.* (12) also suggested that self-esteem is a determinant of health outcomes rather than a consequence of oral disorders in children. However, this is the first study reporting that anxious children and depressive preadolescents have an increased chance of presenting poor OHRQoL. These findings may be explained by the hypothesis that poor self-perceived oral health may contribute to a negative emotional well-being. For example, in the present study, the presence of the signs and symptoms of TMD in children and preadolescents would be associated with symptoms of anxiety and depression (14), which would consequently affect their QoL. Similarly, previous studies have suggested that children and adolescents suffering from TMD pain seem to be more sensitive and more somatically focused than their healthy peers (50, 51). In addition, increased pain and sensations may be responsible for increased depressive symptoms and more impaired OHRQoL in preadolescents reporting TMD (52). However, the present results are based on the hypothesis that poor emotional well-being may "cause" poor self-perceived oral health. Based on this assumption, oral health problems would have little impact on children and preadolescents with a worse psychological well-being, but they would have a pronounced impact on those with better emotional health. For example,

it is more likely that a child's emotional status influences the response to such experiences rather than being changed by life experiences, such as the signs and symptoms of TMD. Existing evidence that children and adolescents from low income households have a poor emotional status is in agreement with this hypothesis (13).

Overall, the present findings agree with contemporary models of disease and its consequences, which suggest that the relation between clinical indicators of disease and HRQoL outcomes is mediated by personal and environmental characteristics (9). Considering the limitations of this study, additional research involving a clinical and general population in various settings is required to confirm our findings with respect to psychological disparities in OHRQoL. Furthermore, to better understand the referents that are reflected in the child and preadolescent answers to the self-perceptions of oral health and its impact on QoL, research based on qualitative methods is necessary. Longitudinal studies, which allow for the evaluation of variations between people over time, are also needed to allow theoretical models to be investigated without the limitations of cross-sectional study designs.

Conclusions

The findings from the present study support the evidence that children and preadolescents view their oral health and its impacts on well-being as multidimensional concepts. Anxious children and depressive preadolescents with signs and symptoms of TMD have an increased chance of reporting a poor QoL. Therefore, clinical and psychological factors must be considered in assessments involving these age groups.

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REFERENCES

1. Baker, S.R. (2007). Testing a conceptual model of oral health: a structural equation modeling approach. *Journal of Dental Research*, 86(8), 708-712.
2. Foster Page, L.A., Thomson, W.M., Jokovic, A., & Locker, D. (2005). Validation of the Child Perceptions Questionnaire (CPQ 11-14). *Journal of Dental Research*, 84(7), 649-652.
3. Gherunpong, S., Tsakos, G., & Sheiham, A. (2004). Developing and evaluating an oral health-related quality of life index for children; the CHILD-OIDP. *Community Dental Health*, 21(2), 161-169.
4. Robinson, P.G., Nalweyiso, N., Busingye, J., & Whitworth, J. (2005). Subjective impacts of dental caries and fluorosis in rural Ugandan children. *Community Dental Health*, 22(4), 231-236.
5. Jokovic, A., Locker, D., Tompson, B., & Guyatt, G. (2004). Questionnaire for measuring oral health-related quality of life in eight- to ten year- old children. *Pediatric Dentistry*, 26(6), 512-518.
6. Jokovic, A., Locker, D., Stephens, M., Kenny, D., Tompson, B., Guyatt, G. (2002). Validity and reliability of a questionnaire for measuring child oral-health-related quality of life. *Journal of Dental Research*, 81(7), 459-463.
7. World Health Organization. (1980). *International Classification of Impairments, Disabilities, and Handicaps*. Geneva: World Health Organization.
8. Locker, D. (1988). Measuring oral health a conceptual framework. *Community Dental Health*, 5(1), 5-13.
9. Wilson, I.B., & Cleary, P.D. (1995). Linking clinical variables with health-related quality of life. A conceptual model of patient outcomes. *The Journal of the American Medical Association*, 273(1), 59-65.
10. Locker, D. (2007). Disparities in oral health-related quality of life in a population of Canadian children. *Community Dentistry and Oral Epidemiology*, 35(5): 348-356.
11. Humphris, G., Freeman, R., Gibson, B., Simpson, K., & Whelton, H. (2005). Oral health-related quality of life for 8-10-year-old children: an assessment of a new measure. *Community Dentistry and Oral Epidemiology*, 33(5), 326-332.

12. Agou, S., Locker, D., Streiner, D.L., & Tompson, B. (2008). Impact of self-esteem on the oral-health-related quality of life of children with malocclusion. *American Journal of Orthodontics and Dentofacial Orthopedics*, 134(4), 484-489.
13. Belfer, M.L., & Rohde, L.A. (2005). Child and adolescent mental health in Latin America and the Caribbean: problems, progress and policy research. *Revista Panamericana de Salud Pública*, 18(4-5), 359-365.
14. Bonjardim, L.R., Gavião, M.B., Pereira, L.J., & Castelo, P.M. (2005). Anxiety and depression in adolescents and their relationship with signs and symptoms of temporomandibular disorders. *The International Journal of Prosthodontics*, 18(4): 347-352.
15. Pereira, S.M., Tagliaferro, E.P., Ambrosano, G.M., Cortelazzi, K.L., Meneghim, M. de C., et al. (2007). Dental caries in 12-year-old schoolchildren and its relationship with socioeconomic and behavioural variables. *Oral Health & Preventive Dentistry*, 5(4), 299-306.
16. World Health Organization. (!997). Oral health surveys. Basic methods. Geneva: World Health Organization.
17. Dean, H.T. (1942). The investigation of physiological effects by the epidemiological method. In: F.R. Moulton (Ed.), *Fluoride and dental health* (23-31). Washington: American Association for Advancement of Science.
18. Cons, N.C., Jenny, J., & Kohout, F.J. (1986). DAI: the Dental Aesthetic Index. Iowa City, IA: Iowa College of Dentistry, University of Iowa.
19. Estioko, L.J., Wright, F.A., & Morgan, M.V. (1994). Orthodontic treatment need of secondary schoolchildren in Heidelberg, Victoria: an epidemiologic study using the Dental Aesthetic Index. *Community Dental Health*, 11(3), 147-151.
20. Dworkin, S.F., & LeResche, L. (1992). Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. *Journal of Craniomandibular Disorders*, 6(4): 301-355.
21. Riolo, M.L., Brandt, D., & TenHave, T.R. (1987). Associations between occlusal characteristics and signs and symptoms of TMJ dysfunction in children and young adults. *American Journal of Orthodontics and Dentofacial Orthopedics*, 92(6), 467-477.

22. Bonjardim, L.R., Gavião, M.B., Carmagnani, F.G., Pereira, L.J., & Castelo, P.M. (2003). Signs and symptoms of temporomandibular joint dysfunction in children with primary dentition. *The Journal of Clinical Pediatric Dentistry*, 28(1), 53-58.
23. Barbosa, T.S., Tureli, M.C.M., & Gavião, M.B.D. (2009). Validity and reliability of the Child Perceptions Questionnaires applied in Brazilian children. *BMC Oral Health*, 9, 13.
24. Gorayeb, M.A.M. (1997). Adaptação, normatização e avaliação das qualidades psicométricas da RCMAS (Revised Children's Manifest Anxiety Scale) para uma amostra de escolares de oito a 13 anos de idade em Ribeirão Preto, SP. Master dissertation. Faculdade de Medicina de Ribeirão Preto, Universidade de São Paulo. Ribeirão Preto.
25. Reynolds, C.R., & Richmond, B.O. (1978). What I think and feel: a revised measure of children's manifest anxiety. *Journal of Abnormal Child Psychology*, 6(2), 271-280.
26. Gouveia, V.V., Barbosa, G.A., Almeida, H.J.F., & Gaião, A.A. (1995). Inventário de depressão infantil - CDI - estudo de adaptação com escolares de João Pessoa. *J Bras Psiquiatr*, 44, 345-349.
27. Kovacs, M. (1985). The Children Depression, Inventory (CDI). *Psychopharmacology Bulletin*, 21(4): 995-999.
28. Hosmer, D.W., & Lemeshow, S. (1989). *Applied logistic regression*. New York: Wiley.
29. Rebok, G., Riley, A., Forrest, C., Starfield, B., Green, B., Robertson, J., et al. (2001). Elementary school-aged children's reports of their health: a cognitive interviewing study. *Quality of Life Research*, 10(1), 59-70.
30. de Oliveira, C.M., & Sheiham, A. (2003). The relationship between normative orthodontic treatment need and oral health-related quality of life. *Community Dentistry and Oral Epidemiology*, 31(6), 426-436.
31. Calis, E.M., Geels, L.M., Prahl-Andersen, B., & Zentner, A. (2009). Oral health-related quality of life and dental esthetics in Amsterdam schoolchildren. *Journal of Dentistry for Children*, 76(2), 130-135.

32. Bos, A., Hoogstraten, J., & Zentner, A. (2010). Perceptions of Dutch orthodontic patients and their parents on oral health-related quality of life. *The Angle Orthodontist*, 80(2), 367-372.
33. Bianco, A., Fortunato, L., Nobile, C.G., & Pavia, M. (2010). Prevalence and determinants of oral impacts on daily performance: results from a survey among school children in Italy. *European Journal of Public Health*, 20(5), 595-600.
34. Marques, L.S., Ramos-Jorge, M.L., Paiva, S.M., & Pordeus, I.A. (2006). Malocclusion: esthetic impact and quality of life among Brazilian schoolchildren. *American Journal of Orthodontics and Dentofacial Orthopedics*, 129(3), 424-427.
35. Michel, G., Bisegger, C., Fuhr, D.C., Abel, T., & KIDSCREEN group. (2009). Age and gender differences in health-related quality of life of children and adolescents in Europe: a multilevel analysis. *Quality of Life Research*, 18(9), 1147-1157.
36. Patton, G.C., & Viner, R. (2007). Pubertal transitions in health. *Lancet*, 369 (9567), 1130-1139.
37. Petersen, A.C., Sarigiani, P.A., & Kennedy, R.E. (1991). Adolescent depression: Why more girls? *Journal of Youth and Adolescence*, 20(2), 247-271.
38. Nolen-Hoeksema, S., Girgus, J.S., & Seligman, M.E.P. (1991). Sex differences in depression and explanatory style in children. *Journal of Youth and Adolescence*, 20(2), 233-245.
39. Steinberg, L., & Morris, A.S. (2001). Adolescent development. *Annual Review of Psychology*, 52, 83-110.
40. Kuehner, C. (2003). Gender differences in unipolar depression: an update of epidemiological findings and possible explanations. *Acta Psychiatrica Scandinavica*, 108(3), 163-174.
41. Gadin, K.G., & Hammarstrom, A. (2005). A possible contributor to the higher degree of girls reporting psychological symptoms compared with boys in grade nine? *European Journal of Public Health*, 15(4): 380-385.
42. Plancherel, B., & Bolognini, M. (1995). Coping and mental health in early adolescence. *Journal of Adolescence*, 18(4), 459-474.

43. Phillipsen, L.C. (1999). Associations between age, gender, and group acceptance and three components of friendship quality. *The Journal of Early Adolescence*, 19(4), 438-464.
44. Colarossi, L.G., & Eccles, J.S. (2000). A prospective study of adolescents' peer support: Gender differences and the influence of parental relationships. *Journal of Youth and Adolescence*, 29(6), 661-678.
45. Chen, M.S., & Hunter, P. (1996). Oral health and quality of life in New Zealand: a social perspective. *Social Science & Medicine*, 43(8), 1213-1222.
46. Do, L.G., & Spencer, A. (2007). Oral health-related quality of life of children by dental caries and fluorosis experience. *Journal of Public Health Dentistry*, 67(3): 132-139.
47. Jedel, E., Carlsson, J., & Stener-Victorin, E. (2007). Health-related quality of life in child patients with temporomandibular disorder pain. *European Journal of Pain*, 11(5), 557-563
48. Gherunpong, S., Tsakos, G., & Sheiham, A. (2004). The prevalence and severity of oral impacts on daily performances in Thai primary school children. *Health and Quality of Life Outcomes*, 2, 57.
49. Tubert-Jeannin, S., Pegon-Machat, E., Gremeau-Richard, C., Lecuyer, M.M., & Tsakos, G. (2005). Validation of a French version of the Child-OIDP index. *European Journal of Oral Sciences*, 113(5), 355-362.
50. List, T., Wahlund, K., & Larsson, B. (2001). Psychosocial functioning and dental factors in adolescents with temporomandibular disorders: a case-control study. *Journal of Orofacial Pain*, 15(3), 218-227.
51. Wahlund, K., List, T., & Ohrbach, R. (2005). The relationship between somatic and emotional stimuli: a comparison between adolescents with temporomandibular disorders (TMD) and a control group. *European Journal of Pain*, 9(2), 219-227.
52. Hirsch, C., & Türp, J.C. (2010). Temporomandibular pain and depression in adolescents--a case-control study. *Clinical Oral Investigations*, 14(2), 145-151.

CAPÍTULO 4

Relationships among oral conditions, global ratings of oral health, overall well-being and emotional statuses of children and preadolescents

TAÍS DE SOUZA BARBOSA¹, PAULA MIDORI CASTELO², MARINA SEVERI LEME¹, MARIA BEATRIZ DUARTE GAVIÃO¹

¹ Department of Pediatric Dentistry, Piracicaba Dental School, University of Campinas, Piracicaba/SP, Brazil

² Department of Biological Sciences, Federal University of São Paulo, Diadema/SP, Brazil

E-mails:

tais_sb@yahoo.com

pcasteloFerrua@hotmail.com

ma_leme@terra.com.br

mbgaviao@fop.unicamp.br

Correspond with:

Prof. Maria Beatriz Duarte Gavião

Faculdade de Odontologia de Piracicaba/UNICAMP – Departamento de Odontologia Infantil – Área de Odontopediatria

Adress: Av. Limeira 901, Piracicaba/SP, Brasil / Zip code: 13414-903

Phone: 55 19 2106 5368/5287 – Fax: #55-19-21065218

E-mail: mbgaviao@fop.unicamp.br

ABSTRACT

Objectives: The purpose of this study was to evaluate the associations between oral conditions, self-perceived oral health, quality of life (QoL) and emotional status in children and preadolescents. **Methods:** For this study, 145 students between the ages of eight and fourteen years were recruited from public schools of Piracicaba, SP, Brazil. Participants were clinically examined for dental caries, gingivitis, fluorosis and malocclusion. They were also examined for signs and symptoms of temporomandibular disorders (TMD) using Axis I of the Research Diagnostic Criteria and a questionnaire for the patients. The self-perception of oral health-related quality of life (OHRQoL) was measured using two global ratings of oral health (OH) and overall well-being (OWB). The Portuguese versions of the Revised Children's Manifest Anxiety Scale (R-CMAS) and Children's Depression Inventory (CDI) were used to assess anxiety and depression, respectively. Saliva sampling was collected 30 min after waking and at night to determine the diurnal decline in salivary cortisol (in $\mu\text{g/dl}$). Differences in psychological scores, physiological data and global ratings of OH and OWB according to age, gender and frequency of oral condition were assessed using a nonpaired t test or a one-way ANOVA, as appropriate. The associations between psychological scores, psychological data and the two global indicators were assessed using Pearson's correlation. Multiple linear regression analyses were used to identify the independent variables associated with the global ratings of OH and OWB. **Results:** Eleven- to fourteen-year-old participants had higher CDI scores ($p<0.01$), higher salivary cortisol values 30 min after waking ($p<0.001$) and at bedtime ($p<0.05$), as well as greater diurnal declines in salivary cortisol concentrations ($p<0.001$). Participants with fewer dental caries had higher salivary cortisol values 30 min after waking and greater diurnal declines in salivary cortisol concentrations ($p<0.05$). Greater diurnal declines of salivary cortisol concentrations were also observed in individuals without gingivitis ($p<0.05$). There were significant differences in diurnal decline of salivary cortisol concentrations and OWB rating scores between individuals with and without TMD, with the former presenting higher values and scores than the latter ($p<0.001$). Females had higher RCMAS scores than boys ($p<0.01$). There was a significant positive correlation between RCMAS and CDI scores and OWB ratings ($p<0.05$). The only independent

variable that remained in the OH model was age ($\beta = 0.312$; $P < 0.001$). The OWB model retained signs and symptoms of TMD ($\beta = 0.271$; $P < 0.001$) and CDI scores ($\beta = 0.175$; $P < 0.05$). **Conclusions:** The present findings suggest that children and preadolescents with poor emotional well-being are more sensitive to the impacts of oral health and its effects on overall well-being.

INTRODUCTION

Over the past two decades, subjective oral health indicators have been used to assess and compare the impact of oral disease across populations. Oral health-related quality of life (OHRQoL) in child and adolescent populations has been of particular interest because oral disorders may produce many symptoms that have physical, social and psychological effects and influence day-to-day living or quality of life (QoL) in this age group (1). A recent review of the OHRQoL literature in pediatric patients showed that, for the most part, studies have focused on the associations between clinical variables and OHRQoL (2) with little emphasis on the underlying psychological characteristics of the patients. This finding is surprising because studies have shown that oral conditions mainly affect socio-emotional aspects of well-being in this population (3-5). A meta-analysis concluded that determinants of QoL are mainly psychological, further supporting the importance of psychological factors in mediating patient-centered QoL outcomes (6). Accordingly, it is not unusual to find only modest associations between clinical indicators and child-reported OHRQoL. This finding is consistent with anecdotal clinical experience (7); some children are very unhappy about relatively mild oral diseases while, paradoxically, others are tolerant of severe oral conditions (8-11). This finding is also consistent with theoretical models of disease, which posit that health outcomes experienced by an individual are determined not only by the nature and severity of the disease but also by personal and environmental characteristics (12).

According to Kressin *et al.* (13), the accurate interpretation of OHRQoL measures requires an understanding of not only the properties of OHRQoL measures but also contextual factors that might influence subjects' assessments of their health and well-being. Previous studies have suggested that psychological attributes, such as self-esteem, may be

predictive of the effect of health conditions on the QoL of children and adolescents (7, 14, 15). Agou *et al.* (16) found that children with better psychological well-being are more likely to report better OHRQoL regardless of their orthodontic treatment status. Hirsch and Türp (17) found that increased pain and sensations might be responsible for increased depressive symptoms and more impaired OHRQoL in preadolescents with TMD. Other studies have pointed to psychological stress as potential risk factor for oral disease in children. Childhood dental caries are positively associated with basal salivary cortisol secretion in response to a stressor (18). Conversely, Rai *et al.* observed an increase in salivary cortisol levels in children with rampant caries and a decrease in these levels three months after dental treatment (19). These authors also proposed that children with greater experience of dental caries would have a reduced ability to cope with general life stress. On the other hand, Kambalimath *et al.* (20) suggested that stress produced by different dental procedures and coping ability were similar in children with and without caries. As the link between stress and dental caries is controversial in the literature, further studies are needed to clarify their relationship.

This study was undertaken to evaluate the relationships between oral conditions, self-perceived oral health, QoL and emotional status, such as symptoms of anxiety and depression and salivary cortisol concentration (as a biomarker of stress), in eight- to fourteen-year-old public school students in Piracicaba, SP, Brazil.

MATERIALS AND METHODS

Participants

The sample size was calculated on the basis of caries experience reported in previous studies conducted in Piracicaba, SP, Brazil (21). Considering a mean of 1.32 DMFT, standard deviation (SD) of 1.92, a sampling error of 20% and a confidence level of 90%, the required sample size was defined as 142 individuals. A total of 145 public school students (49 boys and 96 girls), aged eight- to fourteen-year-old with no systemic diseases or communication and/or neuromuscular problems, participated in the study. Parental consent was obtained for all students.

Exclusion criteria were facial trauma, neurological or psychiatric disorders, use of dental prostheses, current use of medications (e.g., antidepressants, muscle relaxants, narcotics or nonsteroidal anti-inflammatory drugs), previous or current orthodontic treatment or other painful orofacial conditions that could interfere with TMD diagnoses. Participants who did not collect saliva or submitted insufficient/contaminated samples were also excluded.

This study was approved by the Research Ethics Committee of the Piracicaba Dental School, University of Campinas (protocol nº 021/2006).

Data collection

Dental caries, malocclusion, fluorosis and gingivitis

Students were clinically examined for dental caries, gingivitis, fluorosis and malocclusion by two examiners, who were trained in accordance with the WHO Oral Health Surveys: Basic Methods criteria (22). All examinations took place at the school, out of doors in daylight but not direct sunlight.

The caries experience of each participant was assessed using dmft (sum of decayed, missing and filled teeth in the primary dentition) and DMFT (sum of decayed, missing and filled teeth in the permanent dentition) indices. Periodontal status was assessed according to the criteria proposed in the 1997 WHO oral health survey methods manual (22), employing the Community Periodontal Index (CPI). This index classifies periodontal status in patients under the age of 20 years based on six index teeth (16, 11, 26, 36, 31, 46). The codes were as follows: 0 = healthy and 1 = bleeding after probing observed directly or by using a mouth mirror. The presence/absence and severity of dental fluorosis were evaluated using the Dean's index criteria (DI) (23) at the following levels: 0 = normal; 1 = questionable; 2 = very mild; 3 = mild; 4 = moderate and 5 = severe. The score was based on the two most affected teeth. Malocclusion was scored using the Dental Aesthetic Index (DAI) (24), which assesses the relative social acceptability of dental appearance based on 10 intraoral measurements. Each individual is placed on a dental appearance continuum, ranging from 13 (most socially acceptable) to 100 (least acceptable) and orthodontic treatment needs can

be prioritized based on the predefined categories of 'minor/none' (scores 13 to 25), 'definite' (26 to 31), 'severe' (32 to 35), or 'handicapping' (≥ 36) (25).

The dental examiners underwent a calibration session on the day of examination, resulting in inter-examiner kappa scores of 0.96 for DMFT/dmft, 0.80 for fluorosis, 0.73 for gingivitis and 0.88 for DAI scores. After a period of 2 weeks, the intra-examiner reliability was verified by conducting replicate examinations in 20 individuals, resulting in a kappa score of 0.95 for DMFT/dmft, 0.81 for gingivitis, 0.80 for fluorosis and 0.97 for malocclusion.

Signs and symptoms of temporomandibular disorder

Clinical signs of temporomandibular disorders (TMD) were assessed by one examiner using the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) (26), including pain on palpation, mandibular range of motion (mm), associated pain (jaw opening pattern, unassisted opening, maximum assisted opening, mandibular excursive and protrusive movements), sounds from the temporomandibular joint (TMJ) and tenderness induced by muscle and joint palpation. A self-report questionnaire (27) was used to assess subjective symptoms of TMD, such as pain in the jaws when functioning (e.g., chewing), unusually frequent headaches (more than once a week and of unknown etiology), stiffness/tiredness in the jaws, difficulty in opening the mouth wide, teeth grinding and sounds from the TMJ. Each question could be answered with “yes” or “no”. Individuals with at least one sign and one symptom were classified as TMD patients (28).

Prior to clinical examination, the dental examiner (TSB) was trained according to the RDC/TMD (26), which was divided into theoretical discussions on codes and criteria for the study and practical activities. Intra-examiner reliability was confirmed by conducting replicate examinations on 20 individuals one week later.

Global ratings of oral health and overall well-being (as dependent variables)

Participants were asked to give global assessments of their oral health (OH) and the extent to which their oral condition affected their overall well-being (OWB). These

questions preceded the multi-item scales in the Brazilian Portuguese versions of the CPQ for individuals aged eight- to ten-year-old (CPQ₈₋₁₀) and eleven- to fourteen-year-old (CPQ₁₁₋₁₄) (11). These questionnaires formed the basis of a COHQoL designed to assess the impact of oral conditions on the QoL of children and adolescents (29, 30). The children rated their oral health and overall well-being in a four-point response format, ranging from “Very good” (0) to “Poor” (3) and from “Not at all” (0) to “A lot” (3), respectively, in the CPQ₈₋₁₀. In CPQ₁₁₋₁₄, the adolescents gave global ratings on five-point scales ranging from “Excellent” (0) to “Poor” (5) for oral health and from “Not at all” (0) to “Very much” (5) for well-being, respectively.

Symptoms of anxiety and depression

Anxiety symptom data were collected using the Portuguese version of the Revised Children’s Manifest Anxiety Scale (RCMAS) (31) for 6- to 19-year-olds (32). The RCMAS is a 28-item yes/no self-rating scale that consists of items designed to assess physiological symptoms, social concerns and worry. The items were scored as 1 or 0, which yielded a range from 0 to 28. Higher scores indicated greater anxiety.

Symptoms of depression were assessed using the Portuguese version of the Children’s Depression Inventory (CDI) (33), which was originally developed by Kovacs (34). The CDI consists of 27 items designed to assess a variety of symptoms associated with depression, such as sleep disturbance, appetite loss, suicidal thoughts and general dysphoria. Each item consists of three brief statements that describe options ranging from normal responses to responses that indicate moderate or severe symptoms of depression. The items were scored 0 (normal), 1 (moderate), or 2 (severe) for a final range of 0 to 54.

Salivary cortisol concentration

Salivary cortisol samples were collected and analyzed considering the circadian rhythm of cortisol (35). Stimulated saliva samples were collected at home after the subjects and their parents had been given instructions for the collection procedure. They received plastic tubes containing cotton rolls (Salivettes, Sarstedt, Numbrecht, Germany) for collecting saliva. On a weekday, after waking normally, the subjects chewed the cotton

rolls for two minutes, until they had been soaked with saliva, and then placed them into the salivettes. The first sample was taken 30 min after waking (fasting) and the second sample was taken at night (bedtime). Samples were kept on ice and transported to the laboratory on the next day, where they were centrifuged (at 3500 rpm for 5 min) and stored at -80°C for analysis. To minimize variation, all samples from the same subject were assayed in the same batch (in duplicate). Salivary cortisol was assayed in 25 µl samples of whole saliva using a highly sensitive commercial enzyme immunoassay kit (Salimetrics, State College, PA, USA) in a microtiter plate and read at 450 nm (Stat Fax 2100, Awareness Tech. Inc., Palm City, FL, USA), according to the manufacturer's directions. Standard curves were fitted by a weighted regression analysis.

Statistical Analysis

Statistical analysis was performed using SPSS 9.0 (SPSS, Chicago, IL, USA) and considering $\alpha=0.05$. Normality was assessed using the Kolmogorov-Smirnov test. RCMAS and CDI scores for each participant were calculated by summing the item codes. The diurnal decline of salivary cortisol data (in µg/dl) was calculated as the difference between cortisol levels at 30 min after waking and at bedtime. Because of their skewed distributions, RCMAS scores, CDI scores and salivary cortisol values (+30 min, at bed time and diurnal decline) were \log^{10} transformed to more closely approximate normality. Nonpaired t tests and a one-way ANOVA were used, as appropriate, to examine the differences in psychological scores, physiological data and global ratings scores according to age group, gender and frequency of oral conditions. Correlations between the psychological and physiological data and the two global indicators were assessed using Pearson's coefficient. Multiple linear regression analyses were developed to test the associations between global ratings of oral OH and OWB (as dependent variables) and the studied variables. The independent variables considered were age (in years), gender (0 = male, 1 = female), dental caries (DMFT scores), malocclusion (DAI categories), gingivitis (0 = no bleeding, 1 = bleeding), fluorosis (DI scores), signs and symptoms of TMD (0 = no, 1 = yes), RCMAS scores, CDI scores and salivary cortisol values (in µg/dl). All of these factors were entered

into the models, and the least significant terms were regressively dropped until only those with $p < 0.05$ remained (stepwise backward elimination).

RESULTS

Differences in psychological scores, physiological data and global ratings of oral health and overall well-being according to gender and frequency of oral disease

Girls had higher RCMAS scores, i.e., they presented more symptoms of anxiety than did boys ($p < 0.01$). Eleven- to fourteen-year-old participants had higher CDI scores ($p < 0.01$) (Table 1), higher salivary cortisol values 30 min after waking ($p < 0.001$) and at bedtime ($p < 0.05$) and higher diurnal decline of salivary cortisol concentrations ($p < 0.001$) (Table 2). Higher salivary cortisol values 30 min after waking and greater diurnal declines in salivary cortisol concentrations were observed in individuals with lower dental caries experience ($p < 0.05$). Participants without bleeding gums had lower diurnal declines of salivary cortisol concentrations than those with gingivitis ($p < 0.05$). There were significant differences in the diurnal decline of salivary cortisol concentrations between individuals with and without signs and symptoms of TMD, with the former presenting higher concentrations than the latter (0.21 $\mu\text{g/dl}$ vs. 0.16 $\mu\text{g/dl}$).

The differences in global ratings of OH and OWB according to gender and categories of oral conditions are shown in Table 3. There were significant differences between age groups in their global ratings of their oral health, with the eight- to ten-year-old participants perceiving their oral health to be somewhat better than the eleven- to fourteen-year-old participants ($p < 0.001$). Participants with signs and symptoms of TMD indicated that their life was more affected by their oral health than participants without TMD ($p < 0.001$).

Table 1. Differences [mean (\pm SD)] in psychological scores according to gender and categories of oral conditions.

Variables	n	Symptoms of anxiety (scores)	Symptoms of depression (scores)
<i>Age</i>			
8-10 years	73	14.89 (6.93)	8.15 (4.88)*
11-14 years	72	16.26 (6.27)	11.28 (7.56)*
<i>Gender</i>			
Male	49	13.47 (6.46)*	9.24 (4.79)
Female	96	16.65 (6.47)*	9.94 (7.26)
<i>Dental caries</i>			
DMFT/dmft = 0	80	15.14 (6.70)	10.33 (7.42)
DMFT/dmft \geq 1	65	16.11 (6.53)	8.94 (5.17)
<i>Malocclusion</i>			
Minor	78	15.56 (6.10)	9.36 (5.59)
Definitive	28	15.04 (7.57)	11.82 (9.27)
Severe	15	14.47 (5.44)	9.53 (5.48)
Handicapping	24	16.92 (7.83)	8.46 (5.94)
<i>Gingivitis</i>			
No bleeding	115	15.50 (6.50)	9.99 (6.75)
Bleeding	30	15.83 (7.19)	8.60 (5.55)
<i>Fluorosis</i>			
DI = 0	111	15.55 (6.74)	9.95 (6.84)
DI \geq 1	34	15.65 (6.31)	8.91 (5.41)
<i>Sign and symptom of TMD</i>			
No	59	14.83 (6.89)	8.93 (5.53)
Yes	86	16.08 (6.42)	10.23 (7.11)

DMFT/dmft, decayed, missing, and filled teeth; DI, dean's index; TMD, temporomandibular disorder

*p<0.01 (differences between lines, non-paired t test)

Table 2. Differences [mean (\pm SD)] in physiological data (in μ g/dl) according to gender and categories of oral conditions.

Variables	n	Salivary cortisol (+30 min)	Salivary cortisol (bedtime)	Diurnal decline of salivary cortisol
<i>Age</i>				
8-10 years	73	0.16 (0.11)**	0.02 (0.02)*	0.14 (0.11)**
11-14 years	72	0.28 (0.16)**	0.04 (0.05)*	0.24 (0.16)**
<i>Gender</i>				
Male	49	0.21 (0.13)	0.03 (0.03)	0.22 (0.13)
Female	96	0.22 (0.16)	0.03 (0.04)	0.19 (0.15)
<i>Dental caries</i>				
DMFT/dmft = 0	80	0.24 (0.15)*	0.03 (0.03)	0.21 (0.15)*
DMFT/dmft \geq 1	65	0.19 (0.14)*	0.03 (0.05)	0.16 (0.13)*
<i>Malocclusion</i>				
Minor	78	0.24 (0.16)	0.03 (0.04)	0.20 (0.16)
Definitive	28	0.22 (0.14)	0.03 (0.03)	0.19 (0.14)
Severe	15	0.20 (0.12)	0.02 (0.02)	0.18 (0.11)
Handicapping	24	0.16 (0.11)	0.03 (0.06)	0.13 (0.10)
<i>Gingivitis</i>				
No bleeding	115	0.23 (0.15)	0.03 (0.03)	0.20 (0.15)*
Bleeding	30	0.18 (0.13)	0.04 (0.05)	0.15 (0.12)*
<i>Fluorosis</i>				
DI = 0	111	0.20 (0.13)	0.03 (0.04)	0.17 (0.13)
DI \geq 1	34	0.26 (0.19)	0.03 (0.05)	0.23 (0.18)
<i>Sign and symptom of TMD</i>				
No	59	0.19 (0.13)	0.03 (0.05)	0.16 (0.12)*
Yes	86	0.23 (0.16)	0.03 (0.03)	0.21 (0.16)*

DMFT/dmft, decayed, missing, and filled teeth; DI, dean's index; TMD, temporomandibular disorder

*p<0.05; **p<0.001 (differences between lines, non-paired t test)

Table 3. Differences [mean (\pm SD)] in global ratings of oral health and overall well-being according to gender and categories of oral conditions.

Variables	n	Global ratings	
		Oral health	Overall well-being
<i>Age</i>			
8-10 years	73	1.08 (0.94) [*]	0.42 (0.67)
11-14 years	72	1.79 (1.02) [*]	0.68 (0.92)
<i>Gender</i>			
Male	49	1.20 (0.98)	0.39 (0.70)
Female	96	1.55 (1.06)	0.64 (0.85)
<i>Dental caries</i>			
DMFT/dmft = 0	80	1.45 (1.09)	0.54 (0.81)
DMFT/dmft ≥ 1	65	1.42 (0.98)	0.57 (0.81)
<i>Malocclusion</i>			
Minor	78	1.36 (1.02)	0.51 (0.77)
Definitive	28	1.68 (0.98)	0.46 (0.79)
Severe	15	1.47 (1.30)	0.67 (0.90)
Handicapping	24	1.38 (1.01)	0.71 (0.91)
<i>Gingivitis</i>			
No bleeding	115	1.49 (1.03)	0.60 (0.83)
Bleeding	30	1.23 (1.07)	0.37 (0.72)
<i>Fluorosis</i>			
DI = 0	111	1.38 (1.04)	0.57 (0.80)
DI ≥ 1	34	1.62 (1.04)	0.50 (0.83)
<i>Sign and symptom of TMD</i>			
No	59	1.24 (0.99)	0.31 (0.68) [*]
Yes	86	1.57 (1.06)	0.72 (0.85) [*]

DMFT/dmft, decayed, missing, and filled teeth; DI, dean's index; TMD, temporomandibular disorder

*p<0.001 (differences between lines, non-paired t test)

Correlations between psychological and physiological data and global ratings of oral health and overall well-being

Table 4 shows the correlations between psychological and physiological data and global ratings of OH and OWB scores. A significant positive correlation between salivary cortisol 30 min after waking concentrations and global rating of OH was observed ($p < 0.01$).

There was a significant positive correlation between RCMAS and OWB scores ($p < 0.05$). A significant positive correlation was also observed between CDI and global OWB scores ($p < 0.01$).

Table 4. Correlations between psychological scores, physiological data (in $\mu\text{g/dl}$) and global ratings of oral health and overall well-being scores.

Variables	Global ratings			
	Oral health		Overall well-being	
	r^a	p^b	r^a	p^b
RCMAS scores	0.09	0.266	0.21	0.011
CDI scores	0.127	0.127	0.226	0.006
Salivary cortisol (+30 min)	0.21	0.010	0.10	0.205
Salivary cortisol (bedtime)	0.12	0.128	-0.06	0.411
Diurnal decline of salivary cortisol values	0.14	0.079	0.12	0.138

RCMAS, revised children's manifest anxiety scale; CDI, children's depression inventory

^a Pearson's correlation coefficient

^b P -value

Multiple linear regression analyses

Table 5 shows the results of linear regression analyses with the two global indicators as the dependent variables. The only independent variable that remained in the OH model was age ($\beta = 0.312$; $P < 0.001$). The OWB model retained signs and symptoms of TMD ($\beta = 0.271$; $P < 0.001$) and CDI scores ($\beta = 0.175$; $P < 0.05$). This result suggests that

TMD children who reported more symptoms of TMD were more likely to report an effect of oral disease on their lives as a whole.

Table 5. Results of linear regression analyses of global ratings of oral health and overall well-being.

<i>Dependent variable: Global rating of oral health</i>			Significance of the model		
<i>Independent variables:</i>	β	<i>P</i> -value	R ²	<i>F</i>	<i>P</i> -value
Age (in years)	0.312	0.000	0.098	15.455	0.000
<i>Dependent variable: Global rating of overall well-being</i>			Significance of the model		
<i>Independent variables:</i>	β	<i>P</i> -value	R ²	<i>F</i>	<i>P</i> -value
Age (in years)	0.146	0.078	0.175	5.893	0.000
Dental caries (DMFT/dmft scores)	0.147	0.065			
Malocclusion (DAI categories)	0.138	0.087			
Sign and symptom of TMD (0 = no, 1 = yes)	0.271	0.001			
CDI scores	0.175	0.028			

DMFT/dmft, decayed, missing, and filled teeth; DAI, dental aesthetic index; TMD, temporomandibular disorder; CDI, children's depression inventory

DISCUSSION

This study was undertaken to evaluate the correlation between oral health, perceived overall well-being and emotional status in Brazilian children and preadolescents with low socioeconomic status. This population is affected by a several types of oral diseases with varying frequency, ranging from dental caries to temporomandibular disorders, all of which can affect physical function and psychosocial well-being, as observed in our previous studies (11, 36). Moreover, some authors have found correlations between personal and environmental characteristics and self-assessments of oral health in children and adolescents (7, 16, 37), which are consistent with models of disease and its outcomes (12). In the present study, participants with higher salivary concentrations in the morning, which indicates a response to some stressor (e.g., oral disease), reported more negative effects of their oral health on their well-being, and those with more symptoms of anxiety and

depression reported more impacts on their lives as a whole. This finding is unsurprising, as previous research regarding the global ratings used in the present study showed that at least one question in both constructs came from the emotional and social well-being domains (38). These authors also suggested that children's understandings of complex concepts such as health and well-being are also affected by variables such as gender, age and age-related experiences (38).

The assumption that OHRQoL status is age-related is consistent with some psychological theories suggesting that HRQoL decreases with increasing age (39). In puberty, adolescents experience physical and social transitions and need to adapt to their changing bodies and gender identities (39, 40); all of these changes have the potential to affect QoL. Moreover, studies have indicated that these transitions, such as menarche and hormonal fluctuations, as well as the prevalence of stressful life events and specific coping mechanisms (39, 41), may also diminish adolescents' psychological well-being. Similarly, the present study found more symptoms of depression and higher salivary cortisol levels among the eleven- to fourteen-year-old participants than among the eight- to ten-year-olds. Symptoms of anxiety were more frequently observed among female participants. This finding corroborates previous studies that suggested that female adolescents are generally more worried, more concerned with their well-being and more sensitive than male adolescents, making them more vulnerable to psychosomatic disorders and mental complaints (41, 42).

Children and preadolescents with TMD had worse perceptions of the impacts of oral health on their overall well-being than those without signs and symptoms of TMD. Similarly, Hirsch and Türp (17) found lower OHRQoL and increased depressive symptoms in TMD preadolescents, caused by increased pain and sensations that affected their QoL. TMD participants also presented higher average salivary cortisol levels than their counterparts, consistent with previous studies that suggested that children and adolescents suffering from TMD pain seem to be more sensitive and more somatically focused than their healthy peers (43, 44). Thus, it is reasonable to assume that TMD patients are likely to present higher salivary cortisol levels as a response to the stress of TMD pain. Studies performed in adult populations have also confirmed that corticosteroids increase the

likelihood of caries by increasing the incidence of plaque formation (45) and reducing salivary flow rates (46), which may increase the adherence and generation of a cariogenic biofilm on tooth surfaces. However, in the present study, participants who experienced more dental caries had lower salivary cortisol levels in the morning and lower diurnal declines of salivary cortisol concentrations than participants with low caries experience. Moreover, participants with bleeding gums had lower diurnal declines of salivary cortisol levels than controls, indicating better psychological well-being among that patient sample. These findings are consistent with the hypothesis that repeated exposure to adverse events is predictive of an endocrinological trajectory of initial hyper- and subsequent hypocortisolism (47). In other words, the paradoxical finding of lower salivary cortisol levels in individuals with greater experience of dental caries or bleeding gums compared with those without dental caries and gingivitis could represent an early stage of the hypocortisolism trajectory. According to Fries *et al.* (48), hypocortisolism might be caused by chronic stress, and it is possible that the greater duration and accumulation of stressor exposure (e.g., greater experience of dental caries) is physiologically important. In the present study, 40% of participants who had dental caries (DMFT/dmft ≥ 1) reported past experience of toothache, which could be associated with chronic stress and hypocortisolism. On the other hand, the literature on the relationship between dental caries and salivary cortisol levels remains inconclusive. While some studies have found higher salivary cortisol concentrations in children with greater caries experience than in their counterparts (19), others have found no difference (20). Boyce *et al.* (18) reported that childhood dental caries were positively associated not only with basal salivary cortisol secretion but also with low socioeconomic status and larger numbers of cariogenic bacteria. However, a direct comparison between the present results and those in the literature should be done with caution because different methodologies were used in these studies.

The present study also found no difference in RCMAS and CDI scores between individuals with and without oral disease, regardless of frequency. This finding is consistent with previous studies that suggest that rather than being changed by life experiences, such as oral diseases, it is more likely that emotional status influences the response to such experiences (7, 16). Agou *et al.* (7) confirmed that self-esteem is generally

fixed prior to the onset of malocclusion in the permanent dentition, and it is more than likely a determinant of the outcomes of malocclusion, rather than an outcome itself. Similarly, Marques *et al.* (15) found that children with low self-esteem were more sensitive to the aesthetic effects of malocclusion. A follow-up of the children evaluated in Agou *et al.* (7) after they completed orthodontic treatment supported the postulated mediator role of psychological well-being when evaluating OHRQoL outcomes in orthodontic patients (16). Here, the results of multiple linear regression analyses also provide preliminary evidence to support the hypothesis that poor emotional well-being may “cause” poor self-perceived oral health. In the present study, the presence of the signs and symptoms of TMD in children and preadolescents was associated with symptoms of depression, as observed in previous study (49), which consequently affected their lives as a whole. However, as the lack of follow-up limited our confidence in establishing the direction of association in this study, further longitudinal studies assessing oral health, mental well-being and QoL after dental treatment is needed to confirm the present findings and to clarify how emotional characteristics relate to OHRQoL in children and preadolescents.

CONCLUSIONS

The findings of this study support the hypothesis that emotional parameters mediate OHRQoL outcomes in children and preadolescents. Eleven- to fourteen-year-old participants with signs and symptoms of TMD are more likely to present higher salivary cortisol levels and to report lower OHRQoL. In addition, eleven- to fourteen-year-old participants and females are more likely to report symptoms of depression and anxiety, respectively. Symptoms of anxiety and depression are also linked to worse perceptions of oral health, while higher salivary cortisol levels in the morning are correlated with lower overall well-being. Overall, the present results suggest that children and preadolescents with poor emotional well-being were more sensitive to the impacts of oral health and its effects on overall well-being.

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REFERENCES

1. McGrath C, Broder H, Wilson-Genderson M. Assessing the impact of oral health on the life quality of children: implications for research and practice. *Community Dent Oral Epidemiol.* 2004 Apr;32(2):81-5.
2. Barbosa TS, Gavião MB. Oral health-related quality of life in children: part II. Effects of clinical oral health status. A systematic review. *Int J Dent Hyg.* 2008 May;6(2):100-7.
3. Foster Page LA, Thomson WM, Jokovic A, Locker D. Validation of the Child Perceptions Questionnaire (CPQ 11-14). *J Dent Res.* 2005 Jul;84(7):649-52.
4. O'Brien K, Wright JL, Conboy F, Macfarlane T, Mandall N. The child perception questionnaire is valid for malocclusions in the United Kingdom. *Am J Orthod Dentofacial Orthop.* 2006 Apr;129(4):536-40.
5. O'Brien C, Benson PE, Marshman Z. Evaluation of a quality of life measure for children with malocclusion. *J Orthod.* 2007 Sep;34(3):185-93.
6. Smith KW, Avis NE, Assmann SF. Distinguishing between quality of life and health status in quality of life research: a meta-analysis. *Qual Life Res.* 1999 Aug;8(5):447-59.
7. Agou S, Locker D, Streiner DL, Tompson B. Impact of self-esteem on the oral-health-related quality of life of children with malocclusion. *Am J Orthod Dentofacial Orthop.* 2008 Oct;134(4):484-9.
8. Kok YV, Mageson P, Harradine NW, Sprod AJ. Comparing a quality of life measure and the aesthetic component of the index of orthodontic treatment need (IOTN) in assessing orthodontic treatment need and concern. *J Orthod.* 2004 Dec;31(4):312-8.
9. Locker D, Jokovic A, Tompson B. Health-related quality of life of children aged 11 to 14 years with orofacial conditions. *Cleft Palate Craniofac J.* 2005 May;42(3):260-6.

10. Marshman Z, Rodd H, Stern M, Mitchell C, Locker D, Jokovic A, Robinson PG. An evaluation of the Child Perceptions Questionnaire in the UK. *Community Dent Health*. 2005 Sep;22(3):151-5.
11. Barbosa TS, Tureli MCM, Gavião MBD. Validity and reliability of the Child Perceptions Questionnaires applied in Brazilian children. *BMC Oral Health* 2009;9:13.
12. Wilson IB, Cleary PD. Linking clinical variables with health-related quality of life. A conceptual model of patient outcomes. *JAMA*. 1995 Jan 4;273(1):59-65.
13. Kressin NR, Reisine S, Spiro A 3rd, Jones JA. Is negative affectivity associated with oral quality of life? *Community Dent Oral Epidemiol*. 2001 Dec;29(6):412-23.
14. Humphris G, Freeman R, Gibson B, Simpson K, Whelton H. Oral health-related quality of life for 8-10-year-old children: an assessment of a new measure. *Community Dent Oral Epidemiol*. 2005 Oct;33(5):326-32.
15. Marques LS, Ramos-Jorge ML, Paiva SM, Pordeus IA. Malocclusion: esthetic impact and quality of life among Brazilian schoolchildren. *Am J Orthod Dentofacial Orthop*. 2006 Mar;129(3):424-7.
16. Agou S, Locker D, Muirhead V, Thompson B, Streiner DL. Does psychological well-being influence oral-health-related quality of life reports in children receiving orthodontic treatment? *Am J Orthod Dentofacial Orthop*. 2011 Mar;139(3):369-77.
17. Hirsch C, Türp JC. Temporomandibular pain and depression in adolescents--a case-control study. *Clin Oral Investig*. 2010 Apr;14(2):145-51.
18. Boyce WT, Den Besten PK, Stamperdahl J, Zhan L, Jiang Y, Adler NE, Featherstone JD. Social inequalities in childhood dental caries: the convergent roles of stress, bacteria and disadvantage. *Soc Sci Med*. 2010 Nov;71(9):1644-52.
19. Rai K, Hegde AM, Shetty S, Shetty S. Estimation of salivary cortisol in children with rampant caries. *J Clin Pediatr Dent*. 2010 Spring;34(3):249-52.
20. Kambalimath HV, Dixit UB, Thyagi PS. Salivary cortisol response to psychological stress in children with early childhood caries. *Indian J Dent Res*. 2010 Apr-Jun;21(2):231-7.

21. Pereira SM, Tagliaferro EP, Ambrosano GM, Cortelazzi KL, Meneghim M de C, Pereira AC. Dental caries in 12-year-old schoolchildren and its relationship with socioeconomic and behavioural variables. *Oral Health Prev Dent*. 2007;5(4):299-306.
22. World Health Organization: Oral health surveys. Basic methods. Geneva: World Health Organization, 1997.
23. Dean H.T. The investigation of physiological effects by the epidemiological method. In: F.R. Moulton (Ed.), *Fluoride and dental health*. (pp. 23-31). Washington: American Association for Advancement of Science, 1942.
24. Cons NC, Jenny J, Kohout FJ. DAI: the Dental Aesthetic Index. Iowa City, IA: Iowa College of Dentistry, University of Iowa, 1986.
25. Estioko LJ, Wright FA, Morgan MV. Orthodontic treatment need of secondary schoolchildren in Heidelberg, Victoria: an epidemiologic study using the Dental Aesthetic Index. *Community Dent Health*. 1994 Sep;11(3):147-51.
26. Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. *J Craniomandib Disord*. 1992 Fall;6(4):301-55.
27. Riolo ML, Brandt D, TenHave TR. Associations between occlusal characteristics and signs and symptoms of TMJ dysfunction in children and young adults. *Am J Orthod Dentofacial Orthop*. 1987 Dec;92(6):467-77.
28. Bonjardim LR, Gaviao MB, Carmagnani FG, Pereira LJ, Castelo PM. Signs and symptoms of temporomandibular joint dysfunction in children with primary dentition. *J Clin Pediatr Dent*. 2003 Fall;28(1):53-8.
29. Jokovic A, Locker D, Stephens M, Kenny D, Tompson B, Guyatt G. Validity and reliability of a questionnaire for measuring child oral-health-related quality of life. *J Dent Res*. 2002 Jul;81(7):459-63.
30. Jokovic A, Locker D, Tompson B, Guyatt G. Questionnaire for measuring oral health-related quality of life in eight- to ten year- old children. *Pediatr Dent*. 2004 Nov-Dec;26(6):512-8.
31. Gorayeb MAM. Adaptação, normatização e avaliação das qualidades psicométricas da RCMAS (Revised Children's Manifest Anxiety Scale) para uma amostra de escolares

- de oito a 13 anos de idade em Ribeirão Preto, SP. Master dissertation. Faculdade de Medicina de Ribeirão Preto, Universidade de São Paulo. Ribeirão Preto, 1997.
32. Reynolds CR, Richmond BO. What I think and feel: a revised measure of children's manifest anxiety. *J Abnorm Child Psychol*. 1978 Jun;6(2):271-80.
 33. Gouveia VV, Barbosa GA, Almeida HJF, Gaião AA. Inventário de depressão infantil - CDI - estudo de adaptação com escolares de João Pessoa. *J Bras Psiq* 1995;44(7):345-49.
 34. Kovacs M. The Children Depression, Inventory (CDI). *Psychopharmacol Bull*. 1985;21(4):995-8.
 35. Engeland WC, Arnhold MM. Neural circuitry in the regulation of adrenal corticosterone rhythmicity. *Endocrine*. 2005 Dec;28(3):325-32.
 36. Barbosa TS, Leme MS, Castelo PM, Gavião MB. Evaluating oral health-related quality of life measure for children and preadolescents with temporomandibular disorder. *Health Qual Life Outcomes*. 2011 May 12;9:32.
 37. Locker D. Disparities in oral health-related quality of life in a population of Canadian children. *Community Dent Oral Epidemiol*. 2007 Oct;35(5):348-56.
 38. Jokovic A, Locker D, Guyatt G. What do children's global ratings of oral health and well-being measure? *Community Dent Oral Epidemiol*. 2005 Jun;33(3):205-11.
 39. Michel G, Bisegger C, Fuhr DC, Abel T; KIDSCREEN group. Age and gender differences in health-related quality of life of children and adolescents in Europe: a multilevel analysis. *Qual Life Res*. 2009 Nov;18(9):1147-57.
 40. Eccles JS. The development of children ages 6 to 14. *Future Child*. 1999 Fall;9(2):30-44.
 41. Patton GC, Viner R. Pubertal transitions in health. *Lancet*. 2007 Mar 31;369(9567):1130-9.
 42. Steinberg L, Morris AS. Adolescent development. *Annu Rev Psychol*. 2001;52:83-110.
 43. List T, Wahlund K, Larsson B. Psychosocial functioning and dental factors in adolescents with temporomandibular disorders: a case-control study. *J Orofac Pain*. 2001 Summer;15(3):218-27.

44. Wahlund K, List T, Ohrbach R. The relationship between somatic and emotional stimuli: a comparison between adolescents with temporomandibular disorders (TMD) and a control group. *Eur J Pain*. 2005 Apr;9(2):219-27.
45. Hugo FN, Hilgert JB, Bozzetti MC, Bandeira DR, Gonçalves TR, Pawlowski J, de Sousa Mda L. Chronic stress, depression, and cortisol levels as risk indicators of elevated plaque and gingivitis levels in individuals aged 50 years and older. *J Periodontol*. 2006 Jun;77(6):1008-14.
46. Hugo FN, Hilgert JB, Corso S, Padilha DM, Bozzetti MC, Bandeira DR, Pawlowski J, Gonçalves TR. Association of chronic stress, depression symptoms and cortisol with low saliva flow in a sample of south-Brazilians aged 50 years and older. *Gerodontology*. 2008 Mar;25(1):18-25.
47. Gustafsson PE, Anckarsäter H, Lichtenstein P, Nelson N, Gustafsson PA. Does quantity have a quality all its own? Cumulative adversity and up- and down-regulation of circadian salivary cortisol levels in healthy children. *Psychoneuroendocrinology*. 2010 Oct;35(9):1410-5.
48. Fries E, Hesse J, Hellhammer J, Hellhammer DH. A new view on hypocortisolism. *Psychoneuroendocrinology*. 2005 Nov;30(10):1010-6.
49. Bonjardim LR, Gavião MB, Pereira LJ, Castelo PM. Anxiety and depression in adolescents and their relationship with signs and symptoms of temporomandibular disorders. *Int J Prosthodont*. 2005 Jul-Aug;18(4):347-52.

CONCLUSÕES

O presente estudo visou avaliar a qualidade de vida relacionada à saúde bucal e fatores associados em crianças e pré-adolescentes. A partir dos resultados apresentados as seguintes conclusões foram estabelecidas:

1. As medidas de qualidade de vida relacionada à saúde bucal (CPQ₈₋₁₀ e CPQ₁₁₋₁₄) se mostraram válidas e confiáveis para uso em crianças e pré-adolescentes com sinais e sintomas de disfunção temporomandibular. A avaliação do impacto da disfunção temporomandibular na qualidade de vida relacionada à saúde bucal desta população mostrou-se importante uma vez que foram encontrados impactos significativos nos aspectos funcionais, emocionais e sociais destes indivíduos.

2. Crianças e pré-adolescentes com sinais e sintomas de disfunção temporomandibular e maloclusões apresentaram maiores impactos na qualidade de vida relacionada à saúde bucal quando comparados aos controles, entretanto não houve diferença entre os grupos clínicos, o que se deve provavelmente à influência de outros fatores, como pessoais, sociais e ambientais. Os itens associados aos maiores escores de qualidade de vida relacionada à saúde bucal foram predominantemente psicossociais para os grupos com cárie e disfunção temporomandibular, físico e funcionais para crianças com maloclusões e psicossociais para pré-adolescentes com maloclusões. Crianças e pré-adolescentes apresentaram visão multidimensional dos construtos globais de saúde bucal e bem-estar geral.

3. Os resultados encontrados estão de acordo com os modelos contemporâneos de saúde, os quais sugerem a influência de características pessoais e ambientais na percepção de saúde e bem-estar. Crianças e pré-adolescentes com sintomas de ansiedade e depressão, respectivamente, e sinais e sintomas de disfunção temporomandibular, relataram maior comprometimento da qualidade de vida em função do estado de saúde bucal.

4. O aumento na idade e maiores concentrações de cortisol salivar estiveram associados com maiores impactos na percepção global de saúde bucal, enquanto que sinais e sintomas de disfunção temporomandibular e sintomas de ansiedade e depressão estiveram

associados ao maior comprometimento do bem-estar geral. Indivíduos do gênero feminino apresentaram mais sintomas de ansiedade, pré-adolescentes apresentaram mais sintomas de depressão e maiores concentrações de cortisol salivar, sendo estas concentrações mais elevadas também em indivíduos sem experiência de cárie, sem gengivite e com sinais e sintomas de disfunção temporomandibular.

REFERÊNCIAS*

- Agou S, Locker D, Muirhead V, Tompson B, Streiner DL. Does psychological well-being influence oral-health-related quality of life reports in children receiving orthodontic treatment? *Am J Orthod Dentofacial Orthop*. 2011; 139(3): 369-77.
- Agou S, Locker D, Streiner DL, Tompson B. Impact of self-esteem on the oral-health-related quality of life of children with malocclusion. *Am J Orthod Dentofacial Orthop*. 2008; 134(4): 484-9.
- Barbosa TS, Gavião MB. Oral health-related quality of life in children: part II. Effects of clinical oral health status. A systematic review. *Int J Dent Hyg*. 2008; 6(2): 100-7.
- Barbosa TS, Tureli MCM, Gavião MBD. Validity and reliability of the Child Perceptions Questionnaires applied in Brazilian children. *BMC Oral Health*. 2009; 9: 13.
- Boyce WT, Den Besten PK, Stamperdahl J, Zhan L, Jiang Y, Adler NE *et al*. Social inequalities in childhood dental caries: the convergent roles of stress, bacteria and disadvantage. *Soc Sci Med*. 2010; 71(9): 1644-52.
- Dias PF, Gleiser R. Orthodontic treatment need in a group of 9-12-year-old Brazilian schoolchildren. *Braz Oral Res*. 2009 Apr-Jun; 23(2): 182-9.
- Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorder: review, criteria, examinations and specifications, critique. *J Craniomandib Disord*. 1992 Fall;6(4):301-55.
- Hirsch C, Türp JC. Temporomandibular pain and depression in adolescents--a case-control study. *Clin Oral Investig*. 2010; 14(2): 145-51.
- Jedel E, Carlsson J, Stener-Victorin E. Health-related quality of life in child patients with temporomandibular disorder pain. *Eur J Pain*. 2007; 11(5): 557-63.
- Jokovic A, Locker D, Stephens M, Kenny D, Tompson B, Guyatt G. Validity and reliability of a questionnaire for measuring child oral-health-related quality of life. *J Dent Res*. 2002; 81(7): 459-63.

* De acordo com a norma da UNICAMP/FOP, baseadas nas normas do International Committee of Medical Journals Editors – Grupo de Vancouver. Abreviatura dos periódicos em conformidade com o Medline.

- Jokovic A, Locker D, Tompson B, Guyatt G. Questionnaire for measuring oral health-related quality of life in eight- to ten year- old children. *Pediatr Dent*. 2004; 26(6): 512-8.
- Kambalimath HV, Dixit UB, Thyagi PS. Salivary cortisol response to psychological stress in children with early childhood caries. *Indian J Dent Res*. 2010; 21(2): 231-7.
- Locker D. Disparities in oral health-related quality of life in a population of Canadian children. *Community Dent Oral Epidemiol*. 2007; 35(5): 348-56.
- Pereira LJ, Pereira-Cenci T, Del Bel Cury AA, Pereira SM, Pereira AC, Ambrosano GM *et al*. Risk indicators of temporomandibular disorder incidences in early adolescence. *Pediatr Dent*. 2010; 32(4): 324-8.
- Pereira SM, Tagliaferro EP, Ambrosano GM, Cortelazzi KL, Meneghim Mde C, Pereira AC. Dental caries in 12-year-old schoolchildren and its relationship with socioeconomic and behavioural variables. *Oral Health Prev Dent*. 2007; 5(4): 299-306.
- Rai K, Hegde AM, Shetty S, Shetty S. Estimation of salivary cortisol in children with rampant caries. *J Clin Pediatr Dent*. 2010; 34(3): 249-52.
- SB Brasil 2010. Pesquisa Nacional de Saúde bucal. [acesso 2011 Ago 7]. Disponível em: <http://www.saude.gov.br>.
- Wilson IB, Cleary PD. Linking clinical variables with health-related quality of life. A conceptual model of patient outcomes. *JAMA*. 1995; 273(1): 59-65.

APÊNDICE 1

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

As informações contidas neste documento visam convidá-lo a autorizar, por escrito, a participação do menor _____, com pleno conhecimento da natureza dos procedimentos e riscos a que se submeterá o menor, com capacidade de livre arbítrio e sem qualquer coação.

1. Título do projeto

“Avaliação da qualidade de vida, saúde bucal e níveis salivares de cortisol e alfa-amilase e sua associação com variáveis intra e inter indivíduos – estudo longitudinal em crianças”.

2. Responsáveis pela pesquisa

Taís de Souza Barbosa (aluna de Doutorado do Programa de Pós-Graduação em Odontologia, área de concentração em Odontopediatria) e Profa. Dra. Maria Beatriz Duarte Gavião – Departamento de Odontologia Infantil – Área de Odontopediatria da Faculdade de Odontologia de Piracicaba – UNICAMP.

3. Objetivos

Os objetivos deste estudo serão a avaliação clínica de crianças com idade entre oito e doze anos, obtendo-se dados referentes à saúde geral, saúde bucal (cárie, maloclusão, gengivite e fluorose) e presença de sinais e sintomas de disfunções temporomandibulares; avaliação da dieta e variáveis corporais (peso e altura), níveis salivares de hormônios do estresse e auto-avaliação da qualidade de vida geral e relacionada à saúde bucal, bem como níveis de ansiedade, estresse e depressão.

4. Justificativa

A literatura sugere que a influência de fatores locais (cárie, maloclusão, gengivite e fluorose), centrais (hormonais e psicológicos) e comportamentais (necessidade percebida de

tratamento e dieta) estão envolvidos na determinação de uma pior ou melhor qualidade de vida sem, no entanto, conseguir estabelecer a importância de cada fator para o surgimento e permanência desses impactos.

5. Procedimentos do experimento

Todos os procedimentos da pesquisa serão realizados pela mesma pesquisadora, Taís de Souza Barbosa:

Seleção da amostra: será constituída de 150 crianças de ambos os sexos, na faixa etária de oito a doze anos, portadoras de dentição mista, as quais serão selecionadas nas Escolas públicas e particulares de Piracicaba (após a devida concordância da criança em participar da pesquisa e autorizada pelo responsável), de acordo com os seguintes procedimentos:

Anamnese: através de entrevista com o responsável, verificando-se: histórico pré-natal, natal e pós-natal, histórico dentário (comportamento da criança, procura por atendimento odontológico), hábitos de sucção (dedos, chupeta, lábios), ranger dos dentes, tipo e tempo de aleitamento e uso de medicamentos.

Exame clínico bucal e dentário: a pesquisadora será previamente calibrada e as avaliações realizadas seguirão os critérios da Organização Mundial da Saúde (OMS, 1997). Os exames serão realizados nas escolas, as crianças estarão sentadas, utilizando-se luz natural, espelho bucal plano, sonda periodontal tipo OMS e secagem das superfícies com gaze.

Exame funcional: serão avaliados através dos itens incluídos no questionário RDC que é um questionário que avalia dores e ruídos na articulação temporomandibular (perto do ouvido), de ambos os lados, dores nos músculos da mastigação, a capacidade da realização de movimentos da mandíbula.

Avaliação de qualidade de vida geral da criança: cada criança receberá um questionário de auto-avaliação, o qual será respondido sem a interferência de qualquer outra pessoa, onde constarão 26 perguntas que exploram relações familiares, sociais, atividades, saúde, funções corporais e autonomia.

Auto-avaliação de qualidade de vida relacionada à saúde bucal da criança: cada criança receberá o questionário específico para sua faixa etária (8 a 10 anos, 11 a 14 anos) e serão devidamente instruídas antes do preenchimento e esclarecidas quando surgirem

dúvidas. Estes questionários abrangem escalas que avaliam os sintomas bucais, limitações funcionais, bem-estar emocional e bem-estar social.

Auto-avaliação de níveis de ansiedade, estresse e depressão: cada criança receberá o questionário específico para avaliar cada situação (ansiedade, estresse e depressão). Estes questionários serão respondidos individualmente.

Níveis salivares dos hormônios cortisol e alfa-amilase: Estes hormônios serão quantificados através de amostras de saliva coletadas três vezes de cada criança (saliva não estimulada), por meio de materiais inócuos e técnica indolor e não-invasiva.

Avaliação da dieta: a dieta da criança será avaliada através de uma planilha contendo horário e quantidade de alimento ingerido durante o período de uma semana, a qual deverá ser preenchida pelos pais ou responsáveis pela criança.

Avaliação das variáveis corporais (peso e altura): o peso e altura de cada sujeito serão mensurados por meio de balança antropométrica na Faculdade de Odontologia de Piracicaba.

6. Possibilidade de inclusão em grupo controle/placebo

Todas as crianças serão avaliadas e receberão os mesmos procedimentos diagnósticos; portanto, não haverá grupo placebo.

7. Métodos alternativos de diagnóstico ou tratamento da condição

Os métodos conhecidos e consagrados pela literatura serão utilizados na pesquisa. Não será objetivo da pesquisa o tratamento da condição, mas será garantido à criança e ao responsável o esclarecimento sobre sua condição, os riscos à sua integridade física e o encaminhamento à Clínica de Especialização em Odontopediatria ou de Graduação em Odontologia.

8. Riscos previsíveis

Os procedimentos realizados não oferecem riscos. Os exames clínicos serão realizados sob a supervisão da pesquisadora; os mesmos constituem técnicas indolores, não-invasivas, que não oferecem riscos à criança, pois utilizam materiais inócuos e seguem as regras de

assepsia e limpeza preconizadas pela Faculdade de Odontologia de Piracicaba - UNICAMP.

9. Benefícios e vantagens

O tratamento preventivo e/ou curativo (restaurador) necessário estará assegurado à criança, seja realizado pela cirurgiã dentista responsável (aluna de doutorado em Odontopediatria), ou por um aluno da graduação sob orientação da mesma, no caso da criança ainda não estar em atendimento na clínica. No caso da detecção de alterações psicossociais, os responsáveis receberão os devidos esclarecimentos para que procurem orientação psicológica na rede particular ou pública de atendimento. Na presença de maloclusão (problemas ortodônticos), bruxismo ou alteração na função mastigatória, os responsáveis serão alertados, bem como o cirurgião dentista responsável; no caso da criança não se encontrar em tratamento, o encaminhamento à clínica de graduação, se a criança apresentar idade e comportamento compatíveis. No entanto, será alertada ao responsável a possível demora deste procedimento devido a grande quantidade de pacientes cadastrados, podendo ele, se possível, buscar tratamento na rede particular ou pública.

10. Acompanhamento e assistência ao sujeito

O responsável pelo sujeito tem a garantia de ser esclarecido sobre a condição da criança, que deverá receber assistência e acompanhamento odontológicos preventivos e/ou curativos adequados, pela cirurgiã dentista responsável pela criança ou pela pesquisadora, dentro de suas atribuições, durante o período de duração da pesquisa, bem como, se necessário, os esclarecimentos para que procure atendimento por profissionais de outras áreas de saúde, como psicólogos, fonoaudiólogos, etc.

11. Garantia de esclarecimentos

O responsável pelo menor tem a garantia de que receberá respostas a qualquer pergunta ou esclarecimento sobre qualquer dúvida referente aos procedimentos, riscos e benefícios empregados neste documento e outros relacionados à pesquisa, em qualquer momento.

12. Garantia de ressarcimento/indenização/reparação de dano

Não há previsão de ressarcimento ou indenização por dano, pois a participação na pesquisa não trará riscos, nem causará despesas ao voluntário. Caso sessões complementares forem necessárias para obtenção de dados, os gastos de transporte serão de responsabilidade dos pesquisadores.

13. Garantia de sigilo

Haverá sigilo e anonimato quanto aos dados confidenciais obtidos.

14. Retirada do consentimento

O responsável pelo menor tem a liberdade de retirar seu consentimento a qualquer momento e deixar de participar do estudo, sem qualquer prejuízo ao atendimento odontológico a que a criança esteja sendo ou será submetida na Clínica de Especialização em Odontopediatria ou de Graduação em Odontologia desta Faculdade.

15. Garantia de entrega de cópia

Este termo de consentimento compõe-se de duas cópias idênticas, sendo uma entregue ao responsável pelo menor e outra que será arquivada pelo Departamento.

16. Consentimento pós-informação

Eu, _____,
responsável pelo menor _____,
certifico que, tendo lido as informações acima e sido suficientemente esclarecido (a) de todos os itens, estou plenamente de acordo com a realização do experimento e autorizo a execução do trabalho de pesquisa exposto.

Piracicaba, ____ de _____ de _____.

RG: _____ CPF: _____ Tel: _____

Endereço: _____ Assinatura: _____

ATENÇÃO: A sua participação em qualquer outra pesquisa é voluntária. Em caso de dúvida quanto aos seus direitos, escreva para o Comitê de Ética em Pesquisa da FOP – UNICAMP. Endereço: Av: Limeira, 901 – CEP: 13414-900 ou pelo telefone: (19) 21065349. Contato com a Pesquisadora Taís de Souza Barbosa: (19) 21065287 ou acesse: tais_sb@fop.unicamp.br

APÊNDICE 2

FICHA DE ANAMNESE

data ____/____/____

1. ANAMNESE

Nome: _____

Data de nascimento: _____ idade: _____ sexo: _____

Endereço: _____

Telefones: _____ Responsável: _____

Pai _____ Idade _____

Estado civil: ☐ solteira ☐ casada ☐ divorciada ☐ viúva ☐ outros

Grau de instrução: ☐ sem escolaridade ☐ 1º grau ☐ 2º grau ☐ superior

Profissão _____ Fone _____

Mãe _____ Idade _____

Estado civil: ☐ solteira ☐ casada ☐ divorciada ☐ viúva ☐ outros

Grau de instrução: ☐ sem escolaridade ☐ 1º grau ☐ 2º grau ☐ superior

Profissão _____ Fone _____

Primeiro filho? ☐ sim ☐ não + _____ filhos Idades _____

Com quem a criança mora? _____

Variáveis corporais	
Peso	
Altura	
IMC	

História pré-natal, natal, neo-natal e pós-natal

Medicações, tabaco, álcool: ☐ sim ☐ não _____

Outras manifestações durante a gravidez (doenças): _____

Tipo de parto: _____ Intercorrências: _____

Nascimento: ☐ a termo ☐ prematuro Idade materna: _____

Estado civil dos pais na época: _____

Trabalho materno: ☐ sim ☐ não

Licença maternidade: ☐ sim ☐ não

“Quanto tempo você achava que fosse importante para a criança mamar no peito?” _____

Escolaridade materna: _____ Escolaridade paterna: _____

Doenças durante o 1º mês de vida: _____

História/presença de doenças sistêmicas: _____

História/presença de medicamentos: _____

Falecimento familiar: _____

Quem cuidou da criança	mãe	pai	avós	irmãos	babá/outras
do 1º ao 4º ano					
do 4º ano até o presente					

Alimentação

Amamentação natural: até _____ meses

Amamentação natural exclusiva: até _____ meses

Amamentação artificial: de _____ meses até _____

A criança sente desconforto ao comer carne ou alimentos fibrosos? ☐ sim ☐ não

Hábitos

Tipo	Sim	Não	Histórico		Frequência		
			Início	Término	Esporádico	Noite	Contínuo
Sucção digital (dedo _____)							
Sucção de chupeta							
Sucção de lábios							
Onicofagia							
Sucção nutritiva							
Bruxismo relatado pelo responsável							
Enurese noturna							

Características comportamentais

☐ agitado ☐ irritado ☐ triste ☐ calmo ☐ ansioso ☐ desanimado
☐ alegre ☐ desatento ☐ atento ☐ normal ☐ outros _____

2. AVALIAÇÃO PREVENTIVA

Cárie dental na família: ☐ mãe ☐ pai ☐ irmãos

Comentários: _____

Higiene dental: ☐ escova ☐ fio dental ☐ outros

Frequência: _____

Responsável pela escovação: ☐ pais ☐ criança ☐ ambos

Informação sobre higiene bucal ☐ sim ☐ não

por _____

Água fluoretada: ☐ sim ☐ não

Comprimidos ou gotas: ☐ sim ☐ não

3. HISTÓRIA DENTAL

Já foi ao dentista? ☐ sim ☐ não

Se sim, especifique:

Comportamento: ☐ Bom ☐ Regular ☐ Ruim

Problemas manifestados: _____

Se nunca foi ao dentista, especifique o motivo: _____

☐ Medo da criança ☐ Não acha necessário
☐ Falta de oportunidade para tratamento ☐ Tempo disponível
☐ Outros

Está em tratamento atualmente? ☐ sim ☐ não

Se não, especifique o motivo: _____

FACULDADE DE ODONTOLOGIA DE PIRACICABA - UNICAMP

Ficha de Avaliação de Saúde Bucal - OMS 1997

Ficha Nº _____ Nome _____ Série: _____ Examinador _____
Sexo ☐ M ☐ F Idade _____ Nascimento ____/____/____ Data do Exame ____/____/____ Anotador _____
Endereço _____ Bairro _____
Escola _____ Período _____

16	15(55)	14(54)	13(53)	12(52)	11(51)	21(61)	22(62)	23(63)	24(64)	25(65)	26
O V D L M	O V D L M	O V D L M	I V D L M	I V D L M	I V D L M	I V D L M	I V D L M	I V D L M	O V D L M	O V D L M	O V D L M

46	45(85)	44(84)	43(83)	42(82)	41(81)	31(71)	32(72)	33(73)	34(74)	35(75)	36
O V D L M	O V D L M	O V D L M	I V D L M	I V D L M	I V D L M	I V D L M	I V D L M	I V D L M	O V D L M	O V D L M	O V D L M

Condição Dentária

Higido 0 A
Cariado 1 B
Restaurado com cárie 2 C
Restaurado sem cárie 3 D
Perdido por cárie 4 E
Perdido por outras razões 5 F
Selante, verniz 6
Apoio de ponte ou coroa 7 G
Não erupcionado 8
Trauma T
Excluído 9

Perm. Dec.

SUMÁRIO - Dente

c	e	o	ceo-d	tp	hig	C	P	O	CPO-D	TI	HIG

0 Normal
1 Questionável
2 Muito leve
3 Leve
4 Moderada
5 Severa

Fluorose

Malocclusão

5- ☐ 0- normal
☐ 1- leve
☐ 2- moder.

Anomalias dento-faciais

1- Angle (classe I,II,III)
0- normal 1- meia cúsp
2- uma cúspide

2- mordida cruzada
A- anterior 0- ausente 1- unilateral
B- posterior 2- bilateral
C- ant + post

3- overjet (mm)

4- mordida aberta ant (mm)
0- ausente 9- não registrado

6- mordida profunda
0- ausente 1- (1/3)
2- (2/3) 3- total

7- Apinhamento 0 - sem ap 1 - um segm ap
 Espaçamento 2- dois ou mais segm ap

8- respirador bucal
 deglut atípica
0- não 1- sim

9- vedamento labial
0- aus 1- forçado
2- presente

10- interposição labial
durante a deglutição
0- não 1- sim 2- quest.

Condição Gengival

☐ 0- ausência de sangramento
☐ 1- sangramento (3 ou mais coroas sangrantes)

16	55	54	53	52	51	61	62	63	64	65	26
46	85	84	83	82	81	71	72	73	74	75	36

Observações: _____

APÊNDICE 4

QUESTIONÁRIO DE SAÚDE BUCAL INFANTIL - 8-10 ANOS*

Olá,

Obrigado por nos ajudar com nosso estudo!

Estamos fazendo este estudo para entender melhor as coisas que podem acontecer com as crianças por causa de seus **dentes e sua boca**.

POR FAVOR, LEMBRE-SE:

- ☺ Não escreva seu nome no questionário.
- ☺ Isto **não é uma prova** e não existem respostas certas ou erradas.
- ☺ Responda o mais **honestamente** que puder.
- ☺ **Não converse com ninguém** sobre as perguntas enquanto as estiver respondendo.
- ☺ **Ninguém** que Você conhece verá suas respostas.
- ☺ Leia cada pergunta **cuidadosamente** e pense sobre as coisas que aconteceram com Você nas últimas **4 semanas**.
- ☺ Antes de responder, pergunte a Você mesmo: “**Isto acontece comigo por causa dos meus dentes ou da minha boca?**”
- ☺ Coloque um **X** na caixa (☐) à frente da resposta que for **melhor** para Você.

Data de hoje: ____/____/____
 Dia Mês Ano

PRIMEIRO, RESPONDA ALGUMAS PERGUNTAS SOBRE VOCÊ

1. Você é um menino ou uma menina?

- ☐ Menino
- ☐ Menina

* Barbosa TS, Serra MD, Gavião MBD. Qualidade de vida e saúde bucal em crianças Parte I: Versão brasileira do Child Perceptions Questionnaire 8-10. Rev C S Col [periódico na internet] 2008 nov. Disponível em: <http://www.cienciaesaudecoletiva.com.br>

2. Quando você nasceu? ____/____/____ **Idade** ____

Dia Mês Ano

3. Quando você pensa em seus dentes ou boca, você acha que eles são:

- ☐ Muito bons
- ☐ Bons
- ☐ Mais ou menos
- ☐ Ruins

4. Quanto seus dentes ou boca lhe incomodam no dia-a-dia?

- ☐ Nem um pouco
- ☐ Só um pouquinho
- ☐ Mais ou menos
- ☐ Muito

SINTOMAS ORAIS

<p>AGORA RESPONDA ALGUMAS PERGUNTAS SOBRE O QUE ACONTECEU COM SEUS DENTES E SUA BOCA NAS ÚLTIMAS 4 SEMANAS</p>

5. Você teve dor em seus dentes ou em sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

6. Você teve locais doloridos em sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

7. Você teve dor em seus dentes quando tomou bebidas geladas ou comeu alimentos quentes?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

8. Você sentiu alimento grudado em seus dentes?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

RESPONDA AINDA SOBRE O QUE ACONTECEU NAS ÚLTIMAS 4 SEMANAS

9. Você teve mau hálito?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

LIMITAÇÕES FUNCIONAIS

10. Você precisou de mais tempo que os outros para comer seus alimentos devido aos seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

11. Você teve dificuldade para morder ou mastigar alimentos duros, como maçã, milho verde na espiga ou bife devido aos seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

12. Você teve dificuldade para comer o que gostaria devido a problemas nos seus dentes ou na sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

CONTINUE AS RESPOSTAS SOBRE O QUE ACONTECEU COM SEUS DENTES E SUA BOCA NAS ÚLTIMAS 4 SEMANAS

13. Você teve dificuldade para dizer algumas palavras devido a problemas aos seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

14. Você teve problemas enquanto dormia devido aos seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

BEM-ESTAR EMOCIONAL

AGORA RESPONDA ALGUMAS PERGUNTAS SOBRE O QUE ACONTECEU COM
SEUS SENTIMENTOS NAS ÚLTIMAS 4 SEMANAS

15. Você ficou triste devido aos seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

16. Você se sentiu aborrecido devido aos seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

17. Você ficou tímido devido aos seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

18. Você ficou preocupado com o que as outras pessoas pensam sobre seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

19. Você ficou preocupado porque Você não é tão bonito quanto os outros por causa de seus dentes ou sua boca nas últimas 4 semanas?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

BEM-ESTAR SOCIAL

<p>RESPONDA ALGUMAS PERGUNTAS SOBRE O QUE ACONTECEU NA SUA ESCOLA NAS ÚLTIMAS 4 SEMANAS</p>
--

20. Você faltou à escola devido a problemas nos seus dentes ou na sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

21. Você teve dificuldade para fazer sua lição de casa devido a problemas com seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

22. Você teve dificuldade para prestar atenção na aula devido a problemas nos seus dentes ou na sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

23. Você não quis falar ou ler em voz alta na aula devido a problemas nos seus dentes ou na sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

<p>RESPONDA ALGUMAS PERGUNTAS SOBRE VOCÊ JUNTO COM OUTRAS PESSOAS QUE ACONTECERAM NAS ÚLTIMAS 4 SEMANAS</p>

24. Você não quis sorrir ou rir quando estava com outras crianças devido a problemas nos seus dentes ou na sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

25. Você não quis conversar com outras crianças devido aos problemas com seus dentes ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

26. Você não quis ficar perto de outras crianças devido aos seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

27. Você não quis participar de esportes e ir ao parque devido aos seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

28. Outras crianças tiraram sarro de você ou lhe apelidaram devido aos seus dentes ou sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

29. Outras crianças fizeram perguntas sobre seus dentes ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

PRONTO, ACABOU! OBRIGADA POR SUA AJUDA

APÊNDICE 5

QUESTIONÁRIO DE SAÚDE BUCAL INFANTIL - 11-14 ANOS*

Olá,

Obrigado por concordar em nos ajudar com nosso estudo!

Este estudo está sendo feito para que haja maior entendimento sobre os problemas que as crianças podem ter por causa de seus **dentes, boca, lábios e maxilares**. Respondendo às perguntas, você nos ajudará a aprender mais sobre as experiências dos jovens.

POR FAVOR, LEMBRE-SE:

- ☺ Não escreva seu nome no questionário.
- ☺ Isto **não é uma prova** e não existem respostas certas ou erradas.
- ☺ Responda o mais **honestamente** que puder.
- ☺ **Não converse com ninguém** sobre as perguntas enquanto as estiver respondendo. Suas respostas são **personais**; ninguém que você conhece verá suas respostas.
- ☺ Leia cada pergunta **cuidadosamente** e pense sobre as coisas que aconteceram com você **nos últimos 3 meses** enquanto estiver respondendo.
- ☺ Antes de responder, pergunte a você mesmo: **“Isto acontece comigo devido a problemas com meus dentes, lábios, boca ou maxilares?”**
- ☺ Coloque um **X** na caixa (☐) à frente da resposta que for **melhor** para você.

Data de hoje: ____/____/____

DIA MÊS ANO

PRIMEIRO, RESPONDA ALGUMAS PERGUNTAS SOBRE VOCÊ

1. Você é um menino ou uma menina?

☐ Menino

☐ Menina

* Barbosa TS, Gavião MBD. Qualidade de vida e saúde bucal em crianças Parte II: Versão brasileira do Child Perceptions Questionnaire 11-14. Rev C S Col [periódico na internet] 2009 maio. Disponível em: <http://www.cienciaesaudecoletiva.com.br>

2. Quando você nasceu? ____/____/____

DIA MÊS ANO

3. Você acha que a saúde de seus dentes, lábios, maxilares e boca é:

- ☐ Excelente
- ☐ Muito boa
- ☐ Boa
- ☐ Mais ou menos
- ☐ Ruim

4. As condições (boas ou ruins) de seus dentes, lábios ou boca atrapalham sua vida no dia a dia?

- ☐ Nem um pouco
- ☐ Só um pouquinho
- ☐ Mais ou menos
- ☐ Muito
- ☐ MUITÍSSIMO

SINTOMAS ORAIS

PERGUNTAS SOBRE PROBLEMAS BUCAIS

NOS ÚLTIMOS 3 MESES...

5. Você teve dor em seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

6. Você teve sangramento na gengiva?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

7. Você teve feridas em sua boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

NOS ÚLTIMOS 3 MESES...

8. Você teve mau hálito?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

9. Você teve alimento grudado dentro ou entre os dentes?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

10. Você teve alimento preso no céu da boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

LIMITAÇÕES FUNCIONAIS

11. Você costuma respirar pela boca (ou ficar de boca aberta) devido a problemas nos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

NOS ÚLTIMOS 3 MESES...

12. Você levou mais tempo que os outros para comer uma refeição devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

13. Você teve problemas enquanto dormia devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

14. Você teve dificuldade para morder ou mastigar alimentos como maçã, milho verde na espiga ou bife devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

NOS ÚLTIMOS 3 MESES...

15. Você teve dificuldade para abrir bastante a boca devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

16. Você teve dificuldade para dizer alguma palavra devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

17. Você teve dificuldade para comer comidas que você gostaria de comer devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

NOS ÚLTIMOS 3 MESES...

18. Você teve dificuldade para beber com canudinho devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

19. Você teve dificuldade para beber ou comer alimentos quentes ou gelados devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

BEM-ESTAR EMOCIONAL

PERGUNTAS SOBRE SENTIMENTOS

NOS ÚLTIMOS 3 MESES...

20. Você se sentiu irritado ou frustrado devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

21. Você se sentiu inseguro devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

22. Você se sentiu tímido ou envergonhado devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

23. Você ficou preocupado com o que os outros pensam sobre seus dentes, lábios, boca ou maxilares?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

24. Você se preocupou por não ter tão boa aparência como os outros devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

25. Você ficou chateado devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

26. Você se sentiu nervoso ou com medo devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

27. Você se preocupou por não ser tão saudável quanto os outros devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

28. Você se preocupou por ser diferente das outras pessoas devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

BEM-ESTAR SOCIAL

PERGUNTAS SOBRE A ESCOLA

NOS ÚLTIMOS 3 MESES...

29. Você faltou à escola devido à dor de dente, consultas ao dentista ou cirurgias?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

30. Você teve dificuldade para prestar atenção na aula devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

31. Você teve dificuldade para fazer sua lição de casa devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

32. Você não quis falar ou ler em voz alta na aula devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

PERGUNTAS SOBRE SUAS ATIVIDADES NO TEMPO LIVRE E SOBRE ESTAR
COM OUTRAS PESSOAS

NOS ÚLTIMOS 3 MESES...

33. Você não quis participar de atividades como esportes, clubes, teatro, música, viagens escolares devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

34. Você não quis conversar com outras crianças devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

35. Você não quis sorrir ou rir quando estava perto de outras crianças devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

36. Você teve dificuldade para tocar um instrumento musical como flauta ou gaita devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

37. Você não quis passar tempo com outras crianças devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

38. Você discutiu com outras crianças ou com sua família devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

NOS ÚLTIMOS 3 MESES...

39. Outras crianças caçoaram (tiraram sarro) de você devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

40. Outras crianças fizeram você se sentir excluído devido aos seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

41. Outras crianças fizeram perguntas sobre seus dentes, lábios, maxilares ou boca?

- ☐ Nunca
- ☐ Uma ou duas vezes
- ☐ Algumas vezes
- ☐ Várias vezes
- ☐ Todos os dias ou quase todos os dias

PRONTO, ACABOU!

OBRIGADO POR NOS AJUDAR!

ANEXO 1

RESEARCH DIAGNOSTIC CRITERIA – EIXO I*

1. Você tem dor no lado direito do rosto, lado esquerdo ou ambos os lados?

nenhum 0 ☐ direito 1 ☐ esquerdo 2 ☐ ambos 3 ☐

2. Você poderia apontar as áreas aonde você sente dor ?

Direito		Esquerdo	
Nenhuma	0	Nenhuma	0
Articulação	1	Articulação	1
Músculos	2	Músculos	2
Ambos	3	Ambos	3

Examinador apalpa a área apontada pelo paciente, caso não esteja claro se é dor muscular ou articular

3. Padrão de Abertura

Reto 0
Desvio lateral direito (não corrigido) 1
Desvio lateral direito corrigido (“S”) 2
Desvio lateral esquerdo (não corrigido) 3
Desvio lateral corrigido (“S”) 4
Outro 5
Tipo _____(especifique)

* Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. J Craniomandib Disord 1992;6:301-55.

- | | | |
|--|---------------------------------|----|
| 4. Extensão de movimento vertical | incisivos maxilares utilizados: | 11 |
| | | 21 |
| <p>a. Abertura passiva sem dor __ __ mm</p> <p>b. Abertura máxima passiva __ __ mm</p> <p>c. Abertura máxima ativa __ __ mm</p> <p>d. Transpasse incisal vertical __ __ mm</p> | | |

Tabela abaixo: Para os itens “b” e “c” somente

DOR MUSCULAR				DOR ARTICULAR			
nenhuma	direito	esquerdo	ambos	nenhuma	Direito	esquerdo	ambos
0	1	2	3	0	1	2	3
0	1	2	3	0	1	2	3

5. Ruídos articulares (palpação)

a. Abertura

	Direito	Esquerdo
Nenhum	0	0
Estalido	1	1
Crepitação grosseira	2	2
Crepitação fina	3	3
Medida do estalido na abertura	_____ mm	_____ mm

b. Fechamento

	Direito	Esquerdo
Nenhum	0	0
Estalido	1	1
Crepitação grosseira	2	2
Crepitação fina	3	3
Medida do estalido de fechamento	mm	mm

c. Estalido recíproco eliminado durante abertura protrusiva

	Direito	Esquerdo
Sim	0	0
Não	1	1
NA	8	8

6. Excursões

a. Excursão lateral direita ____ mm

b. Excursão lateral esquerda ____ mm

c. Protrusão ____ mm

Tabela abaixo: Para os itens “a”, “b” e “c”

DOR MUSCULAR				DOR ARTICULAR			
nenhuma	direito	esquerdo	ambos	nenhuma	direito	esquerdo	ambos
0	1	2	3	0	1	2	3
0	1	2	3	0	1	2	3
0	1	2	3	0	1	2	3

d. Desvio de linha média ____ mm

direito	esquerdo	NA
1	2	8

7. Ruídos articulares nas excursões

Ruídos direito

	nenhum	estalido	Crepitação grosseira	Crepitação leve
Excursão Direita	0	1	2	3
Excursão Esquerda	0	1	2	3
Protrusão	0	1	2	3

Ruídos esquerdo

	Nenhuma	estalido	Crepitação grosseira	Crepitação leve
Excursão Direita	0	1	2	3
Excursão Esquerda	0	1	2	3
Protrusão	0	1	2	3

INSTRUÇÕES, ÍTENS 8-10

O examinador irá palpar (tocando) diferentes áreas da sua face, cabeça e pescoço. Nós gostaríamos que você indicasse se você não sente dor ou apenas sente pressão (0), ou dor (1-3). Por favor, classifique o quanto de dor você sente para cada uma das palpações de acordo com a escala abaixo. Circule o número que corresponde a quantidade de dor que você sente. Nós gostaríamos que você fizesse uma classificação separada para as palpações direita e esquerda.

0 = Sem dor / somente pressão

1 = dor leve

2 = dor moderada

3 = dor severa

8. Dor muscular extra-oral com palpação

	DIREITO	ESQUERDO
a. Temporal (posterior) “parte de trás da têmpora”	0 1 2 3	0 1 2 3
b. Temporal (médio) “meio da têmpora”	0 1 2 3	0 1 2 3
c. Temporal (anterior) “parte anterior da têmpora”	0 1 2 3	0 1 2 3
d. Masseter (superior) “bochecha/abaixo do zigoma”	0 1 2 3	0 1 2 3

e. Masseter (médio) “bochecha/lado da face”	0 1 2 3	0 1 2 3
f. Masseter (inferior) “bochecha/linha da mandíbula”	0 1 2 3	0 1 2 3
g. Região mandibular posterior (estilo-hióide/região posterior do digástrico) “mandíbula/região da garganta”	0 1 2 3	0 1 2 3
h. Região submandibular (pterigoide medial/supra-hióide/região anterior do digástrico) “abaixo do queixo”	0 1 2 3	0 1 2 3

9. Dor articular com palpação

	DIREITO	ESQUERDO
a. Polo lateral “por fora”	0 1 2 3	0 1 2 3
b. Ligamento posterior “dentro do ouvido”	0 1 2 3	0 1 2 3

10. Dor muscular intra-oral com palpação

	DIREITO	ESQUERDO
a. Área do pterigoide lateral “atrás dos molares superiores”	0 1 2 3	0 1 2 3
b. Tendão do temporal “tendão”	0 1 2 3	0 1 2 3

ANEXO 2

RESEARCH DIAGNOSTIC CRITERIA – EIXO II*

Q3. Você sente dor na face, em locais como na região das bochechas, nos lados da cabeça, na frente do ouvido, nas últimas 4 semanas? () sim () não

14a) Alguma vez sua boca já ficou travada de forma que você não conseguiu abrir totalmente? () sim () não

14b) Este travamento da sua boca foi grave a ponto de interferir com a sua capacidade de mastigar? () sim () não

* Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. J Craniomandib Disord 1992;6:301-55.

ANEXO 3

SINTOMAS DE DISFUNÇÃO TEMPOROMANDIBULAR*

1. Você tem alguma dor ou sensibilidade na mandíbula ou na face durante a mastigação dos alimentos? () sim () não

2. Você tem algum problema em abrir sua boca? () sim () não

3. Quando abre ou fecha a boca, você ouve algum barulho perto do ouvido? () sim () não

4. Você já percebeu ou alguém já te disse que você aperta ou range os dentes durante o dia ou a noite? () sim () não

5. Você tem dor de cabeça freqüente (1 vez por semana)? () sim () não

Já foi ao médico para saber sobre tal problema: _____

Origem conhecida: _____

* Riolo ML, Brandt D, TenHave TR. Associations between occlusal characteristics and signs and symptoms of TMJ dysfunction in children and young adults. Am J Orthod Dentofacial Orthop 1987;92:467-77.

ANEXO 4

ESCALA DE ANSIEDADE “O QUE PENSO E SINTO”*

Nome: _____

Idade: ____ anos **D.N.:** ____ / ____ / ____ **Sexo:** ____ **Data:** ____ / ____ / ____

Escola: _____ **Série:** _____

Coloque um **X** na caixa (☐) à frente da resposta que for **melhor** para você.

- | | | |
|--|------------------------------|------------------------------|
| 01 - Eu acho difícil tomar decisões | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 02 - Eu fico nervoso quando as coisas não dão certo para mim | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 03 - Parece que os outros fazem as coisas com mais facilidade que eu | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 04 - Eu gosto de todo mundo que conheço | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 05 - Muitas vezes tenho falta de ar | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 06 - Eu fico preocupado a maior parte do tempo | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 07 - Eu tenho medo de muitas coisas | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 08 - Eu sou sempre legal | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 09 - Fico bravo por qualquer coisa | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 10 - Fico preocupado com o que meus pais vão dizer para mim | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 11 - Sinto que os outros não gostam do jeito que eu faço as coisas | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 12 - Sou sempre bem educado | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 13 - É difícil para mim ir para a cama à noite | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 14 - Eu me preocupo com o que os outros pensam de mim | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |

* Gorayeb MAM. Adaptação, normatização e avaliação das qualidades psicométricas da RCMAS (Revised Children's Manifest Anxiety Scale) para uma amostra de escolares de oito a 13 anos de idade em Ribeirão Preto, SP. Master dissertation. Faculdade de Medicina de Ribeirão Preto, Universidade de São Paulo. Ribeirão Preto, 1997.

- | | | |
|--|------------------------------|------------------------------|
| 15 - Eu me sinto sozinho mesmo quando há pessoas comigo | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 16 - Sou sempre bom | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 17 - Muitas vezes, sinto problemas no estômago | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 18 - Fico triste com qualquer coisa | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 19 - Minhas mãos ficam suadas | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 20 - Sou legal com todo mundo | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 21 - Estou bastante cansado | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 22 - Eu me preocupo com o que vai acontecer | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 23 - As outras crianças são mais felizes que eu | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 24 - Sempre falo a verdade | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 25 - Tenho sonhos ruins | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 26 - Fico triste quando estou com problemas | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 27 - Sinto que alguém vai dizer que faço as coisas do jeito errado | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 28 - Nunca fico bravo | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 29 - Algumas vezes acordo assustado | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 30 - Eu me preocupo quando vou para a cama à noite | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 31 - É difícil para mim prestar atenção no trabalho da escola | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 32 - Nunca digo coisas que não deveria | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 33 - Eu me mexo bastante na carteira | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 34 - Sou nervoso | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 35 - Muitas pessoas estão contra mim | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 36 - Nunca minto | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |
| 37 - Em geral, acho que alguma coisa ruim vai acontecer para mim | <input type="checkbox"/> Sim | <input type="checkbox"/> Não |

ANEXO 5

QUESTIONÁRIO DE DEPRESSÃO DA CRIANÇA*

Nome: _____

Idade: _____ anos D.N.: ____ / ____ / _____ Sexo: ____ Data: ____ / ____ / _____

Escola: _____ Série: _____

ESCOLHA AS FRASES QUE DESCREVEM SEUS SENTIMENTOS E SEUS PENSAMENTOS NAS ÚLTIMAS DUAS SEMANAS.

1. ☐ Eu fico triste de vez em quando
 ☐ Eu fico triste muitas vezes
 ☐ Eu fico triste o tempo todo

2. ☐ Nada nunca vai dar certo para mim
 ☐ Não tenho certeza se as coisas vão dar certo para mim
 ☐ Vai dar tudo certo para mim

3. ☐ Eu faço quase tudo certo
 ☐ Muitas vezes eu faço errado
 ☐ Eu faço tudo errado

4. ☐ Eu me divirto com muitas coisas
 ☐ Eu me divirto com algumas coisas
 ☐ Não me divirto com nada

* Gouveia VV, Barbosa GA, Almeida HJF, Gaião AA. Inventário de depressão infantil - CDI - estudo de adaptação com escolares de João Pessoa. J Bras Psiq 1995;44:345-49.

5. ☐ Eu sou ruim o tempo todo
 ☐ Muitas vezes eu sou ruim
 ☐ Eu sou ruim uma vez ou outra
6. ☐ Eu penso que coisas ruins possam acontecer comigo uma vez ou outra
 ☐ Eu fico preocupado que coisas ruins aconteçam comigo
 ☐ Eu tenho certeza que coisas horríveis vão acontecer comigo
7. ☐ Eu me detesto
 ☐ Eu não gosto de mim
 ☐ Eu gosto de mim
8. ☐ Todas as coisas ruins acontecem por minha culpa
 ☐ Muitas coisas ruins acontecem por minha culpa
 ☐ As coisas ruins geralmente não acontecem por minha culpa
9. ☐ Eu não penso em me matar
 ☐ Eu penso em me matar, mas não faria isso
 ☐ Eu quero me matar
10. ☐ Tenho vontade de chorar todos os dias
 ☐ Muitos dias eu tenho vontade de chorar
 ☐ Tenho vontade de chorar uma vez ou outra
11. ☐ Tem sempre uma coisa me aborrecendo
 ☐ Muitas vezes tem uma coisa me aborrecendo
 ☐ Uma vez ou outra tem alguma coisa me aborrecendo
12. ☐ Eu gosto de estar com outras pessoas
 ☐ Muitas vezes eu não consigo estar com outras pessoas
 ☐ Eu não tenho vontade de estar com ninguém

13. () Eu não consigo me decidir sobre nada
() É difícil tomar decisões
() Eu me decido sobre as coisas facilmente
14. () Minha aparência é legal
() Tem umas coisas que eu não gosto na minha aparência
() Eu sou feio(a)
15. () Eu tenho sempre que me forçar a fazer minhas tarefas escolares
() Muitas vezes eu tenho que me forçar a fazer minhas tarefas escolares
() Não tenho problemas para fazer as tarefas escolares
16. () Tenho problema para dormir todas as noites
() Muitas vezes tenho problema para dormir
() Eu durmo bem
17. () Eu fico cansado uma vez ou outra
() Muitos dias eu fico cansado
() Estou sempre cansado
18. () Na maioria dos dias eu não estou a fim de comer
() Muitos dias eu não estou a fim de comer
() Eu como bem
19. () Não me preocupo com dores
() Muitas vezes eu me preocupo com dores
() Eu sempre me preocupo com dores
20. () Eu não me sinto sozinho
() Muitas vezes eu me sinto sozinho
() Eu sempre me sinto sozinho

21. ☐ Nunca me divirto na escola
☐ Só me divirto na escola uma vez ou outra
☐ Muitas vezes me divirto na escola
22. ☐ Eu tenho muitos amigos
☐ Eu tenho muitos amigos, mas queria ter mais
☐ Eu não tenho amigos
23. ☐ Meu rendimento na escola está bom
☐ Meu rendimento na escola não está tão bom quanto antes
☐ Estou indo mal em matérias nas quais eu ia bem
24. ☐ Nunca vou ser tão bom quanto os outros
☐ Se eu quiser posso ser tão bom quanto os outros
☐ Sou tão bom quanto os outros
25. ☐ Ninguém me ama de verdade
☐ Não tenho certeza se alguém me ama
☐ Tenho certeza que alguém me ama
26. ☐ Eu geralmente faço o que me mandam fazer
☐ Eu geralmente não faço o que me mandam fazer
☐ Eu nunca faço o que me mandam fazer
27. ☐ Eu me dou bem com as pessoas
☐ Muitas vezes eu me meto em brigas
☐ Eu me meto em brigas o tempo todo



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CERTIFICADO

O Comitê de Ética em Pesquisa da FOP-UNICAMP certifica que o projeto de pesquisa "**Avaliação da qualidade de vida, saúde bucal e nível de cortisol salivar em crianças**", protocolo nº **021/2006**, dos pesquisadores **MARIA BEATRIZ DUARTE GAVIÃO** e **TAÍS DE SOUZA BARBOSA**, satisfaz as exigências do Conselho Nacional de Saúde – Ministério da Saúde para as pesquisas em seres humanos e foi aprovado por este comitê em 27/04/2006.

The Research Ethics Committee of the School of Dentistry of Piracicaba - State University of Campinas, certify that project "**Evaluation of the quality of life, oral health and level of cortisol salivar in children**", register number **021/2006**, of **MARIA BEATRIZ DUARTE GAVIÃO** and **TAÍS DE SOUZA BARBOSA**, comply with the recommendations of the National Health Council – Ministry of Health of Brazil for researching in human subjects and was approved by this committee at 27/04/2006.


Profa. Cecilia Gatti Guirado
Secretária
CEP/FOP/UNICAMP


Prof. Jacks Jorge Júnior
Coordenador
CEP/FOP/UNICAMP

Nota: O título do protocolo aparece como fornecido pelos pesquisadores, sem qualquer edição.
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Authors: TAÍS DE SOUZA BARBOSA, PAULA MIDORI CASTELO, MARINA SEVERI LEME, MARIA BEATRIZ DUARTE GAVIÃO

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Authors: Tais de Souza Barbosa, Paula Midori Castelo, Marina Severi Leme, Maria Beatriz Duarte Gavião

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ANEXO 11

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Evaluating oral health-related quality of life measure for children and preadolescents with temporomandibular disorder.

Barbosa TS, Leme MS, Castelo PM, Gavião MB.

Department of Pediatric Dentistry, Piracicaba Dental School, State University of Campinas, Piracicaba/SP, Brazil.
mbgaviao@fop.unicamp.br.

Abstract

ABSTRACT:

BACKGROUND: Oral health-related quality of life (OHRQoL) in children and adolescents with signs and symptoms of temporomandibular disorder (TMD) has not yet been measured. This study aimed to evaluate the validity and reliability of OHRQoL measure for use in children and preadolescents with signs and symptoms of TMD.

METHODS: Five hundred and forty-seven students aged 8-14 years were recruited from public schools in Piracicaba, Brazil. Self-perceptions of QoL were measured using the Brazilian Portuguese versions of Child Perceptions Questionnaires (CPQ)8-10 (n = 247) and CPQ11-14 (n = 300). A single examiner, trained and calibrated for diagnosis according to the Axis I of the Research Diagnostic Criteria for TMD (RDC/TMD), examined the participants. A self-report questionnaire assessed subjective symptoms of TMD. Intraexaminer reliability was assessed for the RDC/TMD clinical examinations using Cohen's Kappa (κ) and intraclass correlation coefficient (ICC). Criterion validity was calculated using the Spearman's correlation, construct validity using the Spearman's correlation and the Mann-Whitney test, and the magnitude of the difference between groups using effect size (ES). Reliability was determined using Cronbach's alpha, alpha if the item was deleted and corrected item-total correlation.

RESULTS: Intraexaminer reliability values ranged from regular ($\kappa = 0.30$) to excellent ($\kappa = 0.98$) for the categorical variables and from moderate (ICC = 0.49) to substantial (ICC = 0.74) for the continuous variables. Criterion validity was supported by significant associations between both CPQ scores and pain-related questions for the TMD groups. Mean CPQ8-10 scores were slightly higher for TMD children than control children (ES = 0.43). Preadolescents with TMD had moderately higher scores than the control ones (ES = 0.62; $p < 0.0001$). Significant correlation between the CPQ scores and global oral health, as well as overall well-being ratings ($p < 0.001$) occurred, supporting the construct validity. The Cronbach's alphas were 0.93 for CPQ8-10 and 0.94 for CPQ11-14. For the overall CPQ8-10 and CPQ11-14 scales, the corrected item-total correlation coefficients ranged from 0.39-0.76 and from 0.28-0.73, respectively. The alpha coefficients did not increase when any of the items were deleted in either CPQ samples.

CONCLUSIONS: The questionnaires are valid and reliable for use in children and preadolescents with signs and symptoms of temporomandibular disorder.

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